708-DS / 709-DS
Dissolution Apparatus

Operator's Manual

Agilent Technologies

Notices

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CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

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1 Safety

Electrical Hazards 11

The Agilent 708-DS / 709-DS has been designed and tested so that when used properly you have an accurate, fast, flexible, and safe instrument.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Operation of a Agilent 708-DS / 709-DS involves the use of aqueous liquids and various pharmaceutical dosage forms. Unskilled, improper, or careless use of this instrument can create shock hazards, fire hazards, or other hazards which can cause death, serious injury to personnel, or severe damage to equipment and property.

Information on safety practices is provided with your instrument and operation manuals. Before using your instrument or accessories, you must thoroughly read these safety practices.

Observe all relevant safety practices at all times.

Electrical Hazards

The dissolution apparatus contains electrical circuits, devices, and components operating at dangerous voltages. Contact with these circuits, devices, and components can cause death, serious injury, or painful electric shock.

Panels or covers that are retained by fasteners which require the use of a tool for removal may be opened only by Agilent-trained, Agilent-qualified, or Agilent-authorized service engineers. Consult the manuals or product labels supplied with the dissolution apparatus to determine which parts are operator-accessible.

Application of the wrong supply voltage, connection of the instrument to an incorrectly wired supply outlet, or lack of proper electrical grounding can create a fire hazard or a potentially serious shock hazard and could seriously damage the instrument and any attached ancillary equipment.

Always use a three-wire outlet with ground connection which is adequately rated for the load. The installation must comply with local, state, and federal safety regulations.

Do not connect the instrument to the main power supply until you have made sure that the operating voltage is correctly set for the main power supply in the specific outlet in your laboratory to which the equipment will be connected.

Warning

WARNING

A ‘Warning’ message appears in the manual when failure to observe instructions or precautions could result in death or injury.

Read all warnings and cautions carefully and observe them at all times.

Caution

CAUTION

A ‘Caution’ message appears in the manual when failure to observe instructions could result in damage to equipment (Agilent supplied and / or other associated equipment).

Note

NOTE

A ‘Note’ appears in the manual to give advice or information.

Information Symbols

I	Switches main power on
0	Switches main power off
	Indicates single-phase alternating current
	Indicates the product complies with the requirements of one or more European Union (EU) directives.
	Indicates specific equipment meets standards of safety. These products are safe for use in the workplace for North America.
	Indicates that this product must not be disposed of as unsorted municipal waste. All Agilent products that are subject to the WEEE directive shipped after August 13, 2005 are compliant with the WEEE marking requirements. Such products are marked with the "crossed out wheelie bin" WEEE symbol in accordance with European Standard EN 50419. For more information on collection, reuse, and recycling systems, please contact your local/regional waste administration, your local distributor, or Agilent.
	Indicates the product complies with regulatory compliance requirements of New Zealand and Australia.

2
Introduction

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Agilent's 708-DS and 709-DS Dissolution Apparatus are designed for dissolution testing of a variety of pharmaceutical products, including tablets, capsules, and transdermal patches. Using a common platform, both models are available with an intuitive, color touch screen interface. Likewise, you may select the 708-DS for traditional water bath vessel heating, or choose the 709-DS for simplified, bath-free, self-heating vessels with Agilent's Direct Vessel Heating (DVH). Each apparatus can be tailored to support several innovative features designed to allow unattended dissolution testing, including Dosage Delivery Module (DDM), AutoTemp, and Auto Sampling.

WARNING **The dissolution apparatus contains electrical circuits, devices, and components operating at dangerous voltages. Contact with these circuits, devices and components can cause death, serious injury, or painful electric shock.**

CAUTION Panels or covers that are retained by fasteners which require the use of a tool for removal may be opened only by Agilent-trained, Agilent-qualified, or Agilent-authorized service engineers

Conventions Used in this Manual

- Items you are asked to press are in bold. For example, “press **H** on the keypad”.
- Key sequences you are asked to press appear like this: **MENU** > **7**.

Serial Number Format

The serial number contains 10 characters and follows this syntax:

CC1234xxxx

Syntax Code	Meaning	Description
CC	Country of origin	2 alpha characters matching the required trade designation for the country of origin
12	Year of manufacture	‘09’ for 2009, ‘10’ for 2010, etc.
34	Week of manufacture	‘01’ for week 1 to ‘52’ for week 52

3
Setting Up the 708-DS / 709-DS

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Initial Setup

Complete the following sections to initially set up the Agilent 708-DS / 709-DS and all other system components.

Unpacking Procedure

Figure 1 Unpacking

1 Remove the Agilent 708-DS / 709-DS and all other system components from the packing material.

Figure 2 Removing the Apparatus

2 Inspect the equipment and accessories to ensure there has been no damage during shipment.

Environmental Requirements for Installation

- Humidity: max relative humidity 80% for temperatures up to 31 ºC decreasing linearly to 50% relative humidity at 40ºC
- Indoor use only
- Pollution Degree: 2
- Installation Category: II
- Altitude: 2000m
- Temperature: 5 ºC to 40 ºC
- Power: 115/230 V ac, 50/60 Hz, 2.5 A

  Main supply voltage fluctuations are not to exceed ± 10% of the nominal supply voltage

Clearance

1. Prepare the area where the equipment is to be located.
2. Ensure a minimum clearance of 30 cm above the unit (when fully raised) and 10 cm at the rear and on both sides of the Agilent 708-DS / 709-DS. Approximately 82 cm x 82 cm total bench space is required per apparatus.
3. Orient the Agilent 708-DS / 709-DS and all other system components appropriately.

Equipment, Parts, and Accessories As Shipped

Parts and Accessories

Locate the following items, as applicable, for your system configuration:

Agilent 708-DS / 709-DS Dissolution Apparatus	Alignment Posts or Evaporation Plugs
Heater / Circulator (708-DS)	Evaporation Covers
DVH Power Controller (709-DS)	Evaporation Cover Plugs
6-pin Cable for Heater / Circulator (708-DS)	TruAlign Blank Vessel Position Covers
DVH Power Controller Communication Cable (709-DS)	3-Fin Baskets (709-DS)
Bath Temperature Probe (708-DS)	Thermal Printer Paper
External Vessel Temperature Probe (optional)	17-mm Open-end Wrench
Power Cord(s)	90 ° Allen Key (for Level Adjustment)
Manifold Arm Labels	Shaft Locking Collars
6-pin Cable for Heater / Circulator	Vessel Centering Tool
Bath Temperature Probe	Thermal Printer Paper
Rinse Cups (or Tray)	7/64" T-handle Allen Wrench
Dissolution Vessels	Stainless Steel Tubing Clamps (708-DS)
Alignment Posts	Plastic Tubing - 1/2" outer diameter (708-DS)
DDM Assemblies	25-mm Height Spheres
Basket Shaft Assemblies	Clip-on Basket Height Gauge
Paddle Shaft Assemblies	Bubble Level
Technical Documentation CD	

Tubing / Cable Connections

Complete the following sections to connect the necessary tubing and cables for the Agilent 708-DS / 709-DS.

Heater / Circulator Setup (708-DS)

CAUTION Do not turn on the heater / circulator before filling the water bath to avoid damaging the internal heating elements of the circulator.

NOTE The Agilent Wide Input Range Heater / Circulator is pre-installed on the apparatus at the factory. If reinstallation or replacement is required, please refer to the *Agilent Wide Input Range Heater / Circulator Operator's Manual* (located on the Technical Documentation CD) for complete installation instructions.

1 Connect the six-pin cable to the rear of the heater / circulator and the other end into the position marked BATH HEATER on the dissolution apparatus rear panel.

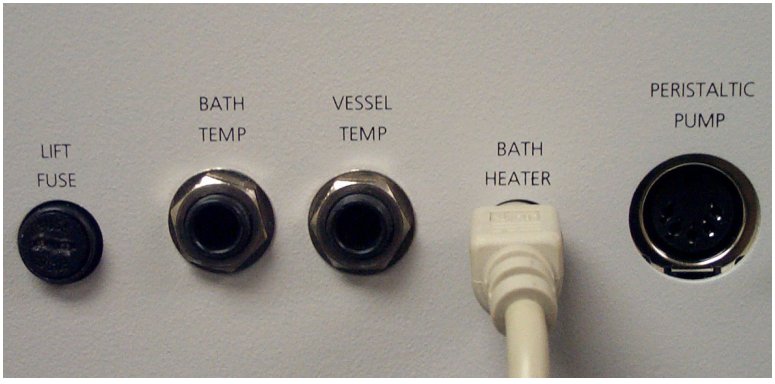


Figure 3 BATH HEATER Connector

Instrument Level / Water Bath Setup

Complete the following sections to properly level the instrument and fill the water bath.

Level Instrument

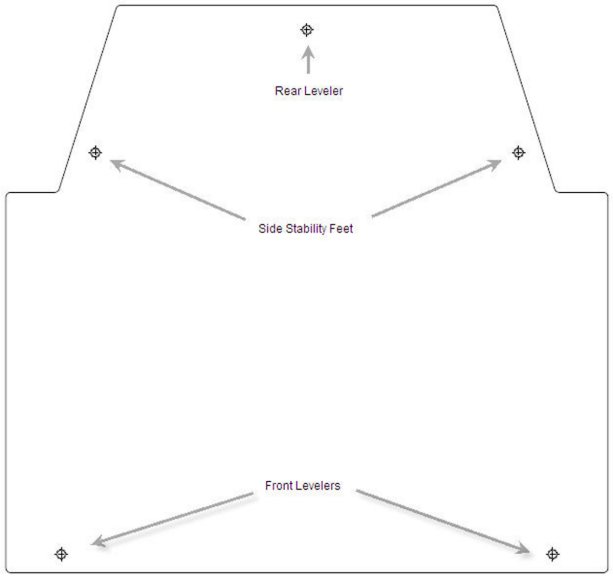


Figure 4 Levelers and Stability Feet

1 Remove the black caps from the five (5) screws located on the front, side, and rear of the base plate of the dissolution apparatus.

Figure 5 Level-Adjustment Screw Caps

2 Raise the side stability feet located toward the back on either side of the base plate so they are not touching the laboratory bench.

Figure 6 Raising the Stability Feet

3 Using the 90º Allen key in the top of the front level-adjustment screws, adjust the screws to achieve left-to-right level within tolerance. It may be necessary to loosen the nut(s) beneath the base plate to allow for adjustment.

4 Using the 90º Allen key in the top of the rear level-adjustment screw, adjust the screw to achieve front-to-back level within tolerance. It may be necessary to lift the heater / circulator to gain access to this screw.

5 Verify the level of the dissolution apparatus with a bubble or digital level.

6 Once the unit is leveled, use the open-end wrench to tighten the nut(s) below the base plate.

7 Lower the side stability feet located toward the back on either side of the base plate until they touch the laboratory bench. Do not over-tighten to ensure level is maintained.

8 Reinstall the black caps on all of the screws.

DVH Power Controller Setup (709-DS)

1. Install the DVH Power Controller box in the back of the 709-DS, beneath the vessel plate. Ensure that the rubber feet of the control box do not sit in any holes on the vessel plate.
2. Connect the cable attached to the vessel plate to the circular input on the DVH Power Controller box.
3. Connect the communication cable (RJ-45) from the DVH Power Controller box to the DVH Comm port on the back of the drive unit.

Figure 7 DVH Power Controller

Temperature Probe Installation (708-DS)

1 Insert the water bath temperature probe into the BATH TEMP jack on the rear of the dissolution apparatus drive unit.

Figure 8 BATH TEMP Connector

2 Place the other end of the temperature probe through the hole in the center of the vessel plate in the water bath.

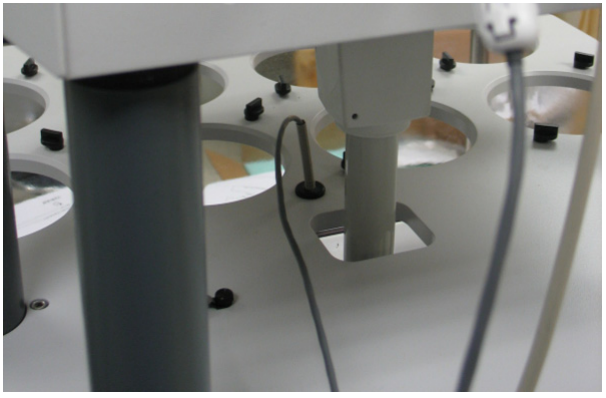


Figure 9 Positioning the Temperature Probe

EVT Probe Installation (708-DS)

1. If applicable, insert the EVT Probe cable into the VESSEL TEMP jack on the rear of the dissolution apparatus drive unit.
2. Place the vessel temperature probe in the hole in the vessel plate, at the left side rear of the apparatus.

Power Cord Connections

CAUTION Ensure the correct voltage has been supplied prior to connecting the power cables.

1. Connect or verify connections of power cords to all components.
2. Plug the cords into electrical outlets of the appropriate voltage.

708-DS / 709-DS Initial Power Up

CAUTION Ensure the retaining ties have been removed. Failure to do so could result in significant damage to the instrument.

1. Turn on the power of the dissolution apparatus using the switch located on the left side of the drive unit.
2. Ensure the self test conducted upon initialization passes, which is indicated by a green check mark.

Filling the Water Bath (708-DS)

1 If necessary, press and hold **Drive** ⏏ on the Main screen to allow for access to the water bath.

2 Fill the water bath to an appropriate level with purified water, using the label affixed to the bath as a guide. Be sure to allow for displacement of the water once the dissolution vessels are installed.

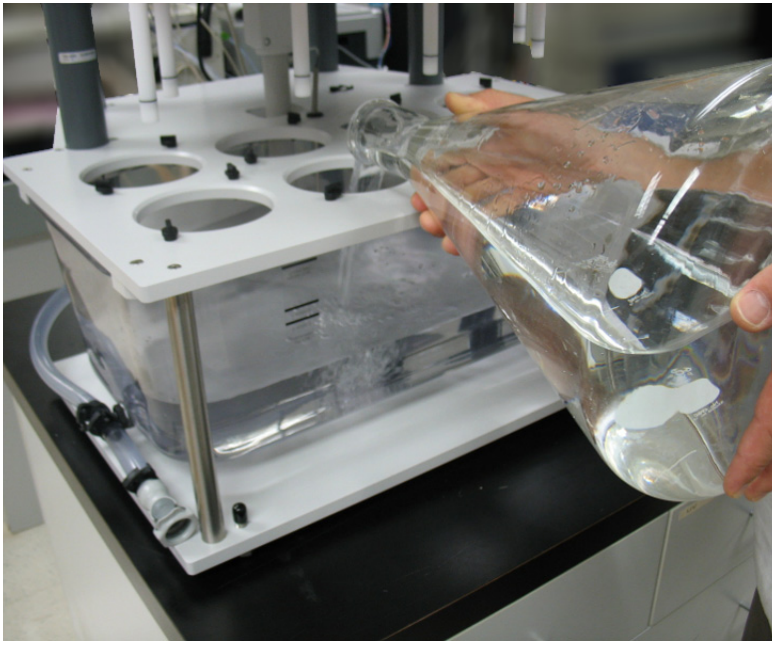


Figure 10 Filling the Water Bath

Level Instrument - Re-verification

1 With the water bath filled (if applicable), re-verify the instrument level front to back and right to left using a bubble or digital level.

Heater / Circulator Power-up (708-DS)

NOTE

Use ultrapure water when possible to minimize scale and mineral buildup. Use algaecide to inhibit mold and bacteria and algae growth. Check the label to ensure the formulation is compatible with the plastic materials used in the water bath construction. The flow paths of the heater / circulator are primarily stainless steel and should tolerate most clear water bath formulations.

1 Turn on the power to the heater / circulator using the switch located on the unit.

2 Ensure the water flow through the heater / circulator begins. To release air trapped in the pump or heater cartridge, follow the priming instructions located on the heater / circulator.

3 Repeat the procedure, if necessary.

4 Ensure no leaks are present at any of the tubing connections.

Agilent 708-DS / 709-DS Setup

Complete the following sections to set up the Agilent 708-DS / 709-DS.

Vessel Isolation Chamber Installation (709-DS)

1 Insert a vessel isolation chamber for each applicable position between the vessel plate and the base plate of the 709-DS.

NOTE The wiring on the underside of the vessel plate should be avoided during chamber installation. To accomplish this, begin by installing the rear middle positions first from the left side of the 709-DS.

2 Ensure the center peg on the bottom surface of each chamber aligns with the hole in the base plate.

3 Locate the isolation chamber mirrors and place one in the bottom of each of the cylinders.

Vessel Installation

NOTE Bubbles on the surface of the vessel, like the one centered in the figure below, are not a manufacturing defect and will not affect performance.

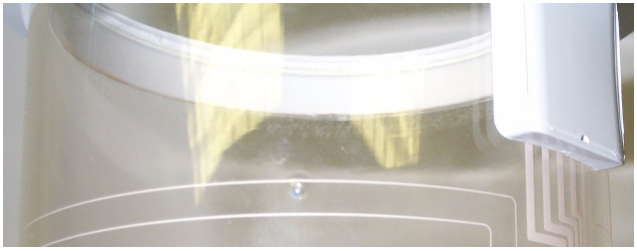


Figure 11 Vessel Bubble

1 Press **Drive** to move the drive unit to the fully raised position.

2 Carefully install the dissolution vessels in the vessel plate.

3 For the 708-DS vessel, engage the clips for each position over the rim of the vessel to secure it in place.

For the 709-DS vessel, open the clip, install the vessel, and close the clip.

CAUTION Ensure the connection pins in the vessel socket are aligned with the holes on the vessel.

4 If necessary, place the TruAlign blank vessel position covers on the vessel plate openings at Position 7 and Position 8. Rotate the two clips for each position over the cover to secure it in place.

Sample Manifold Installation

1 From the Main screen, press **Menu** > **Diagnostics**.

2 Position the sample manifold so the center screw is aligned with the center receptor beneath the drive unit. Ensure the left and right alignment shafts are also positioned correctly.

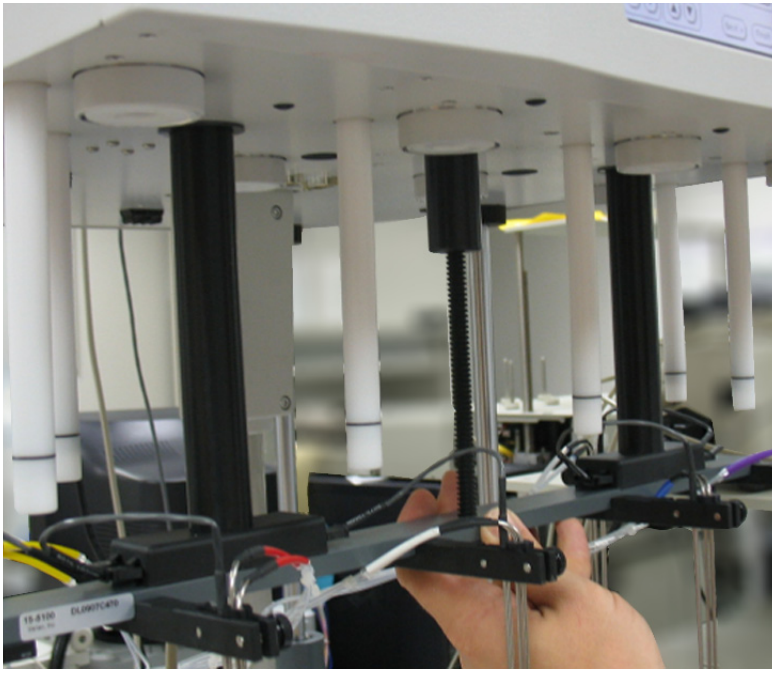


Figure 12 Positioning the Manifold for Installation

3 Push the manifold up into the drive unit until resistance is met.

4 While gently lifting upward, press **Load** from within the Manifold Control box. The internal drive should slowly lift the manifold to its fully raised position.

5 If the unit is equipped with AutoTemp, attach the two 9-pin RS232 cables to the underside of the drive unit.

Figure 13 Connecting AutoTemp

6 If the unit is equipped with autosampling, locate the black sample tubing fasteners and attach the fastener to the sample tubing wrap.

7 If applicable, affix the fasteners to the underside of the drive unit. A fastener is affixed to the left and to the right of the center drive unit lift.

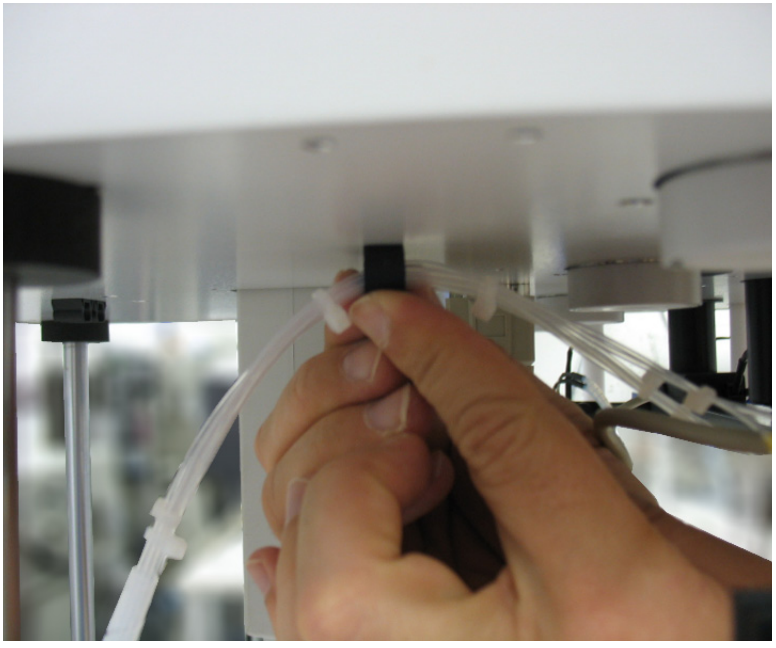


Figure 14 Affixing the Fasteners

Accessory Installation

1. Locate the appropriate accessories from the following list to be configured with the Agilent 708-DS / 709-DS: evaporation covers, Dosage Delivery Modules (DDMs), alignment posts, receptor shafts, paddle shafts, basket shafts, and shaft locking collars.
2. If necessary, press and hold **Drive** ▲ to move the drive unit to its fully raised position**.**
3. If applicable, insert a receptor shaft (spin on/off shafts only) into each spindle location.
4. Slide an evaporation cover onto the shafts to be installed and insert the shaft into each spindle location.

NOTE Ensure that all sample tubing is behind the shaft and clear from all cables. See Figure 15 below.

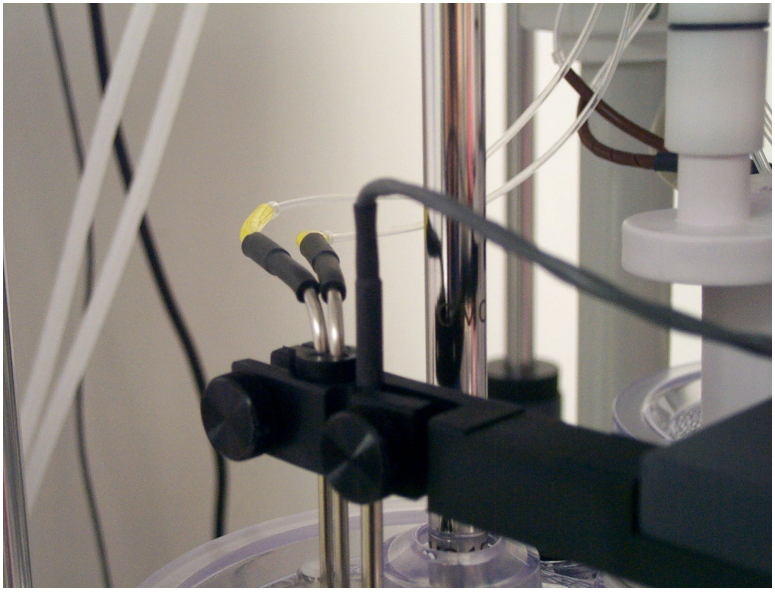


Figure 15 Proper Sample Tubing Position

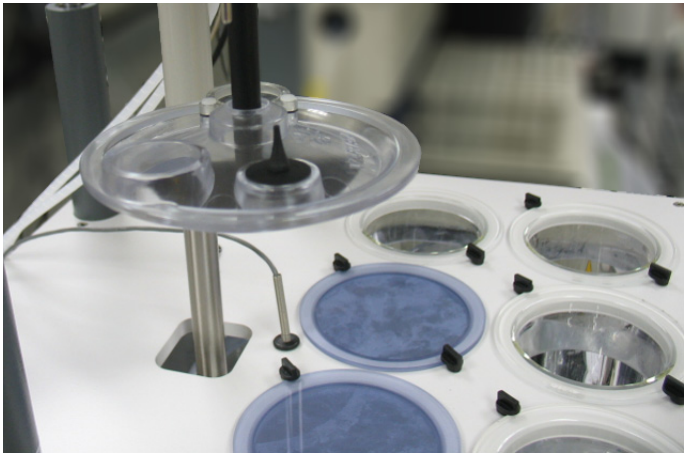


Figure 16 Installing Evaporation Covers on Shafts

5 Place a shaft locking collar on the top of each shaft and slide in down until it rests on top of the drive unit.

Figure 17 Shaft Locking Collars

6 Insert a DDM or alignment post into the DDM Alignment Shaft hanging from the underside of the drive unit.

Figure 18 Dosage Delivery Module and Alignment Post

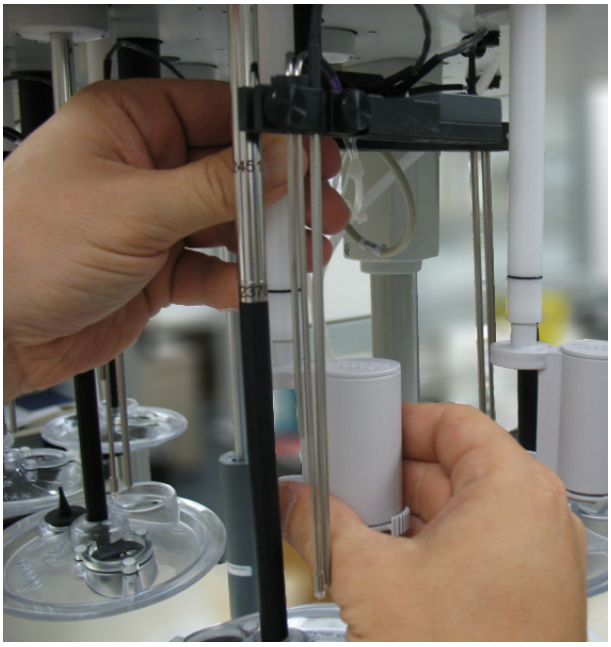


Figure 19 Inserting DDM into DDM Alignment Shaft

7 Repeat the previous step for all applicable positions.

8 Attach the DDM or alignment post to the evaporation cover by aligning the notch with the locking pin of the cover and pushing until fully seated.

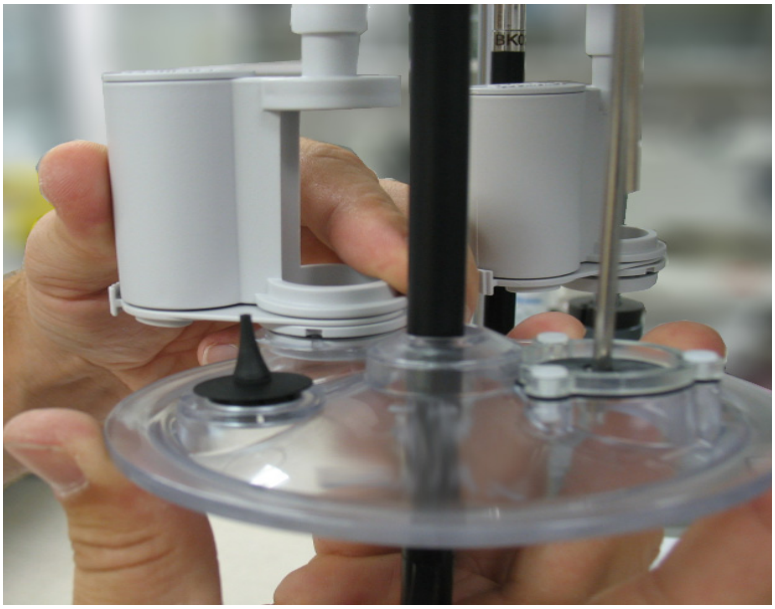


Figure 20 Attaching DDM to Alignment Post

9 Repeat the previous step for all applicable positions.

10 Ensure that the sampling port of the evaporation cover is aligned properly with the sample manifold probes, if applicable.

Figure 21 Accessory Installation

Setting Basket (Apparatus 1) Heights

1. Ensure the drive unit is fully raised and the basket shafts are pushed up sufficiently.
2. Clip the basket height gauge provided onto the bottom of the basket shaft.
3. Lower the drive unit to its operating position (until it stops).
4. With the shaft locking collar loosened, carefully lower the shaft until the bottom of the basket height gauge rests against the bottom of the vessel.
5. Ensure the shaft locking collar is flush against the top of the spindle assembly by rotating each shaft until resistance is met.
6. Tighten the shaft locking collar securely.

Figure 22 Tightening the Shaft Locking Collar

7 Raise the drive unit until sufficient clearance is available to move the basket height gauge to the next position.

8 Repeat steps 2 - 7 for all remaining positions.

Setting Paddle (Apparatus 2) Heights

1 Ensure the drive unit is fully raised and the paddle shafts are pushed up sufficiently.

2 Place a 25-mm height sphere in each vessel.

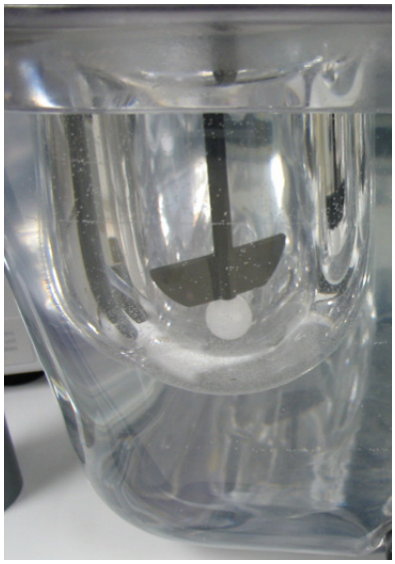


Figure 23 Inserting Height Spheres

3 Lower the drive unit to its operating position (until it stops).

4 With the shaft locking collars loosened, carefully lower each shaft until the bottom of the paddle blade rests against the height sphere.

5 Ensure the shaft locking collar is flush against the top of the spindle assembly by rotating each shaft until resistance is met.

6 Tighten each shaft locking collar securely.

7 Raise the drive unit to its home position.

8 Remove the height spheres from the vessels.

This page was intentionally left blank, except for this message.

4
Operating the 708-DS / 709-DS

Main Screen - Options 48
Menu Screen - System Menu 67
General 708-DS / 709-DS Conventions 96
Agilent 708-DS / 709-DS Notifications 100

Main Screen - Options

The following sections detail the operations available from the 708-DS / 709-DS Main screen.

Main Screen - Display Parameters

The Main screen displays the system status and is updated once per second.

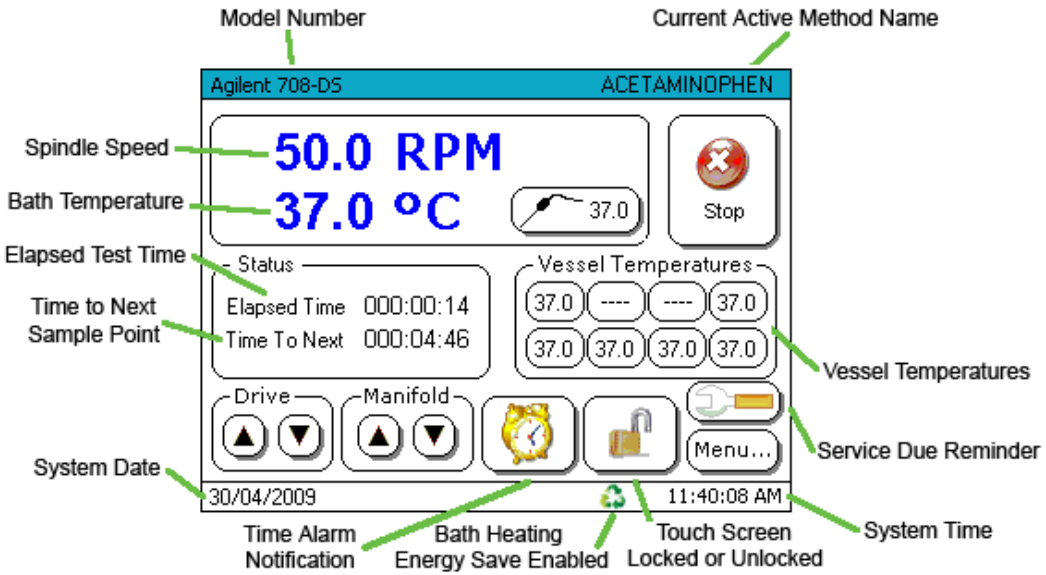


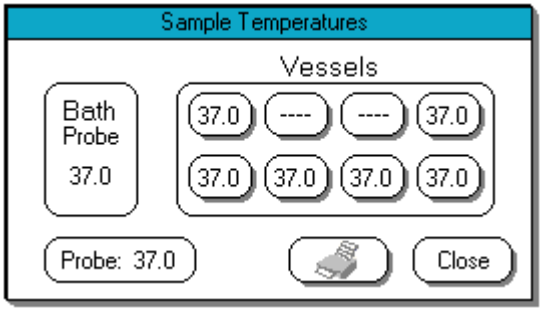
Figure 24 Main Screen - Display Parameters

NOTE

If the apparatus is in idle mode or running a manual method, press the area over the displayed RPM to quick-set the spindle speed. Upon pressing this area, the numeric data entry screen displays. Enter a valid number to change the RPM and press **Ok** to return to the Main screen. The spindle speed changes only if the spindle was previously running. If the spindle was idle, it starts.

Similarly, if you press the area over the displayed temperature, you can quick-set the bath temperature. Upon pressing this area, the numeric data entry screen displays. Enter a valid number to set the bath temperature setpoint. Press **Ok** to return to the Main screen.

Main Screen - Sample Temperatures



NOTE

Sample Temperatures is available only if **Vessel Probe** is selected in the manufacturing configuration.

When you press **Sample Temperature**, the Sample Temperatures box displays. The current bath temperature is displayed in the Bath Probe region and the current vessel probe temperature is displayed in the Probe region. Initially, the temperature at all vessel locations is displayed as "----".

Place the Vessel Probe in the appropriate vessel and press the corresponding vessel location on the screen to record the temperature of the vessel. If a vessel location is invalid (for 6- and 7-vessel configurations), the unit beeps and the selected location remains blank.

NOTE

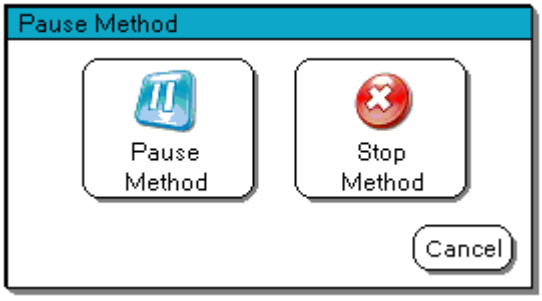
Repeatedly pressing a vessel location causes it to toggle between the current Probe temperature and "----". This allows you correct an incorrect temperature entry.

If the DVH option is installed (709-DS), pressing Bath Probe results in a beep. The Bath temperature remains displayed as "----".

Press **Printer** to print the temperatures. If no printer is installed, the printer icon is not displayed. Press **Close** to close the window and return to the Main screen.

Main Screen - Run

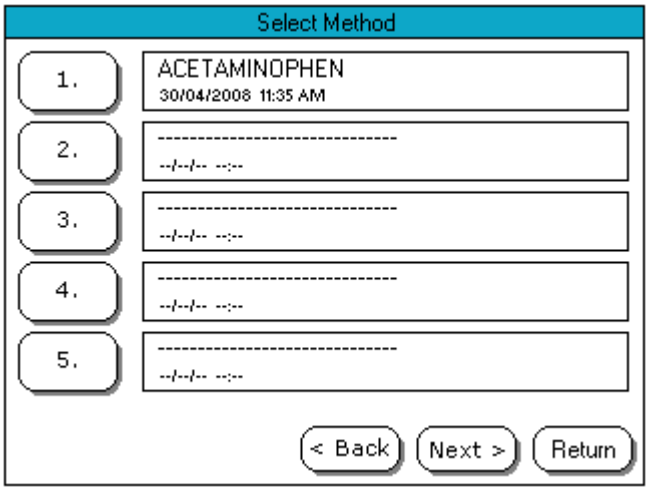
When you press **Run**, the Select Start Type screen displays:



From the Select Start Type screen:

- Press **Method** to select a method.
- Press **Manual** to start manual operation.
- Press **Cancel** to return to the Main screen.

Run - Select Method (Automated)



You can enter up to five automated methods through the Select Method screen. In order to select a method to run, press the number of the method. Selecting a method takes you to the Start Options screen. Press **Return** to return to the Select Start Type screen.

Method - Start Options

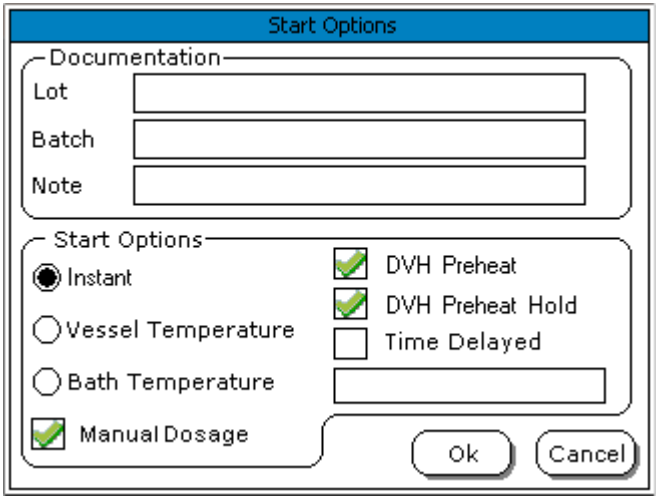


Table 1 Method - Start Options

Option	Function
Instant	The method runs immediately after you press **Ok**.
Vessel Temperature	The manifold lowers the temperature probes into the media. When the selected vessel start temperature has been reached, the method starts. If no manifold is present, this option cannot be selected.
Bath Temperature	The method starts once the water bath has reached its selected start temperature (708-DS only).
Manual Dosage	Place a check in this box to indicate dosage forms will be introduced manually. A visual display will appear on-screen indicating when the user should drop dosage forms into each vessel.
DVH Preheat	This option is enabled for the 709-DS Direct Vessel Heating. Each test will require an initial temperature stabilization if accurate temperatures are desired throughout the test. Remove the check from this box if temperature control is not required (709-DS only).

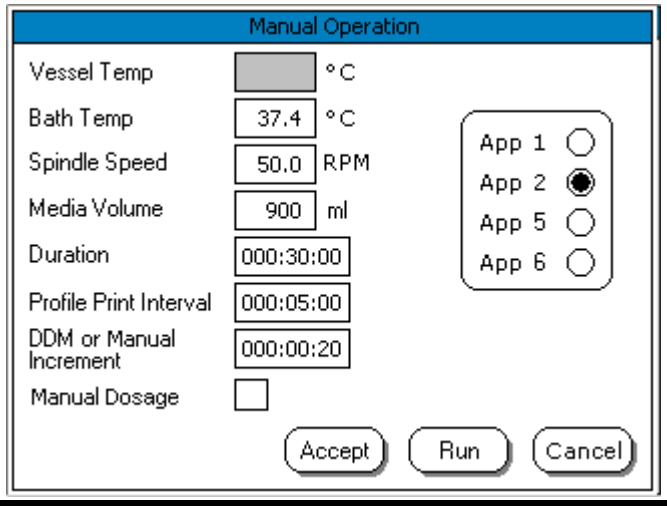
Table 1 Method - Start Options

Option	Function
DVH Preheat Hold	Enable this option to delay start of the test after temperature stabilization. A screen will appear prompting the user to begin once vessel temperature has stabilized. Without this option, the test will begin immediately after the preheat cycle (709-DS only).
Time Delayed	Displays the Date and Time screen. The apparatus begins monitoring appropriate temperatures at the entered time and starts when the selected start condition has been reached.

From the Start Options screen:

- Press **Ok** to start the test with all operational parameters being monitored and return to the Main Screen with the Stop button enabled.
- Press **Cancel** to abort the test start and return to the Select Method screen.

Run - Manual Operation (708-DS)

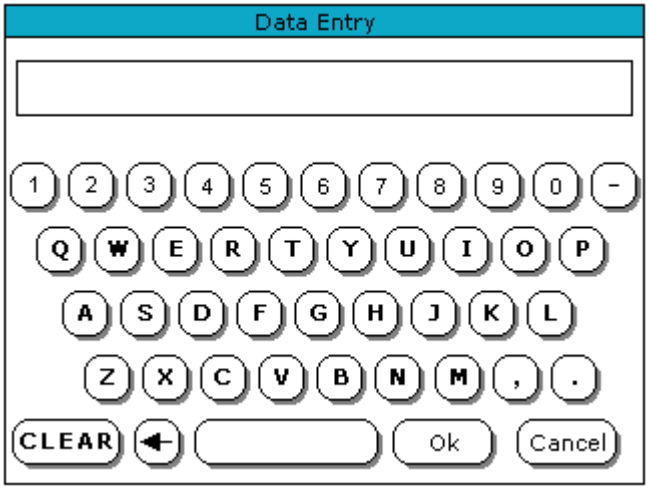


Parameter	Range	Resolution
Temperature (Bath or Vessel)	**25 - 55 ºC**	**0.1 ºC**
Spindle Speed	**10.0 - 250.0 RPM**	**0.1 RPM**
Media Volume	**100 to 2000 mL**	**Depends on configuration**
(Test) Duration	**000:00:10 to 999:59:59**	**1 second**
Profile Print Interval	**000:01:00 to 024:00:00**	**1 second**
DDM Increment	**000:00:00 to 001:39:59**	**1 second**
Apparatus Type	**1, 2, 5, or 6**	

	Function
Manual Dosage	Place a check in this box to indicate dosage forms will be introduced manually. A visual display will appear on screen indicating when you should drop dosage forms into each vessel.

The Apparatus Type and Volume selection is used to control the manifold sampling depth when the manifold option is installed.

The Manual Operation screen allows you to run a manual method. Press the rectangular area following the text description to enter parameters. The Data Entry screen displays, allowing you to enter the data.



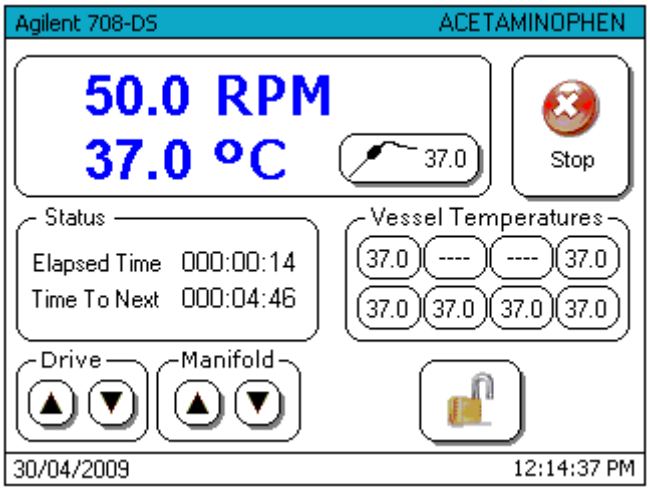
- Press **Cancel** to return to the Select Start Type screen without saving the test information.
- Press **Accept** to save the entered values and return to the Main screen.
- Press **Run** in the Manual Operation screen. The Main screen displays and the following actions take place:

- The Manually Insert Dosage(s) dialog box displays (“Load Dosage Prompt” on page 105).
- If DDMs are installed, tablets are automatically dropped into the vessels simultaneously or sequentially based on the DDM Increment. For example, a DDM Increment of 5 seconds drops the first tablet immediately, the second tablet 5 seconds after the first, and so on until all the tablets have been dropped. If the increment is zero, all tablets are dropped simultaneously.
- Elapsed time is reset to zero and incremented once per second while the test runs.
- The spindles start rotation at the set speed.

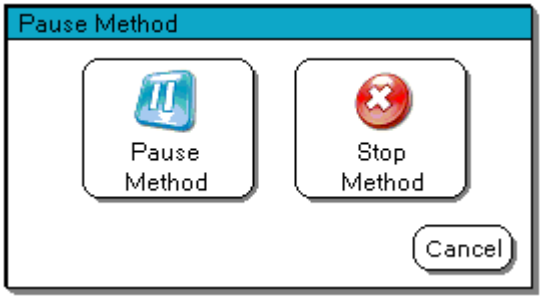
- The bath temperature is maintained at the set temperature. If the bath is not at the set temperature when the test is started, the bath temperature is displayed in red while it heats or cools. A Bath Temperature Error (“Bath Temperature Error” on page 110) displays if the temperature is out of tolerance.
- The displayed system date and time are updated once per second.
- The measured rotational spindle speed and bath / vessel temperature(s) are displayed at an update rate of once per second.
- Run is relabeled Stop.
- If a printer is installed, test data is periodically printed based on the Profile Print Interval.
- The test stops when the elapsed time equals the Test Duration.

Upon completion, a message is printed (if installed and enabled). The display reverts to the Main screen with the Run button enabled.

Main Screen - Stop

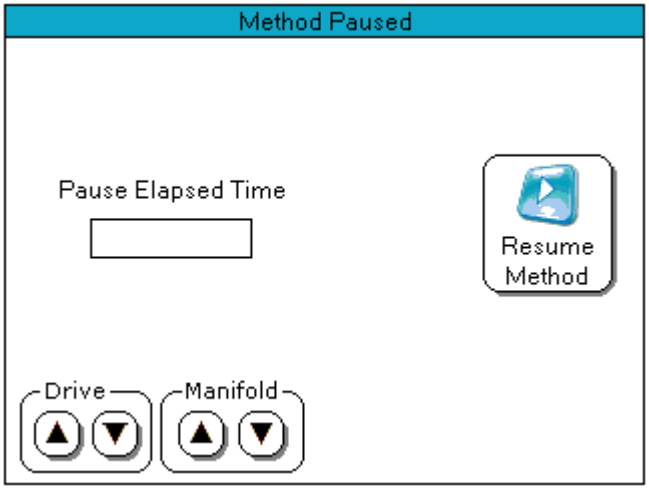


When the system is running, the Stop button is displayed. When you press **Stop**, the Pause Method screen displays:



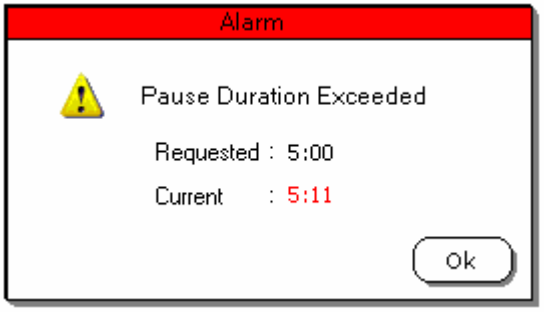
When this screen displays, the currently running method or manual test continues to run until you select an option. You have the option of pausing or stopping the test, or canceling this dialog and returning to the

active method. The Pause Method button allows for media change during a dissolution test. If you select **Pause Method**, the Method Paused screen displays:



When a method is paused, the system takes the following actions:

- The spindles stop.
- If Full Media Change has been selected as a method parameter, the elapsed time counter stops counting.
- A Pause Elapsed Time counter starts counting. If the paused time exceeds the time specified in the Pause Duration Alarm, the Alarm warning screen displays. See “Pause Duration Exceeded” on page 110.



A corresponding message is also printed for documentation. Clearing the Pause Alarm returns you to the Method Paused screen where you can complete the following tasks.

- If installed, the main drive may be raised or lowered.
- If installed, the manifold may be raised or lowered.
- If you press **Resume Method**, the system continues with the test. The paused time is printed, the Main screen displays, and the elapsed time counter resumes counting.

If you select **Stop Method**, the currently running test is terminated and the following actions are taken:

- The instrument returns to the Main screen.
- Stop is relabeled Run.
- The spindles stop.
- The elapsed time is reset to zero.
- The bath is maintained at the last entered temperature.
- The time, date, and the message TEST ABORTED BY USER are sent to the printer.

Main Screen - Drive Unit Up / Down

Press **Drive** ▲ to raise the drive unit as long as the button is held. Release **Drive** ▲ to stop the motion. Press **Drive** ▼ to lower the drive unit. Double-tap **Drive** ▲ to allow the drive unit to raise to its highest position without holding your finger on the button. There is no double-tap function for **Drive** ▼.

NOTE

If the drive unit reaches the upper- or lower-limit switches, the motion stops automatically. Once an end-of-travel limit has been reached, only the arrow in the opposite direction operates.

For example, if the drive unit is raised completely, the Up arrow no longer causes motion but the Down arrow may be used to lower the drive unit. Once away from the limit sensors, both arrows resume normal operation.

Manual Drive Unit Up / Down

The manual lift is controlled by a knob on the right side of the instrument. To adjust the position of the drive unit, loosen the knob and raise or lower to the desired position. Tighten the knob to secure the drive unit in position.

Figure 25 Manual Lift Knob

Manual Sampling

If your Agilent 708-DS / 709-DS is not equipped with the Auto Sampling option for unattended sample collection, you will have to retrieve the samples manually. The evaporation cover design provides easy access to the appropriate dissolution sampling zone with the traditional manual sampling cannula.

Figure 26 Taking a Manual Sample

The various ports of the standard evaporation cover of the Agilent 708-DS / 709-DS are described in the following figure:

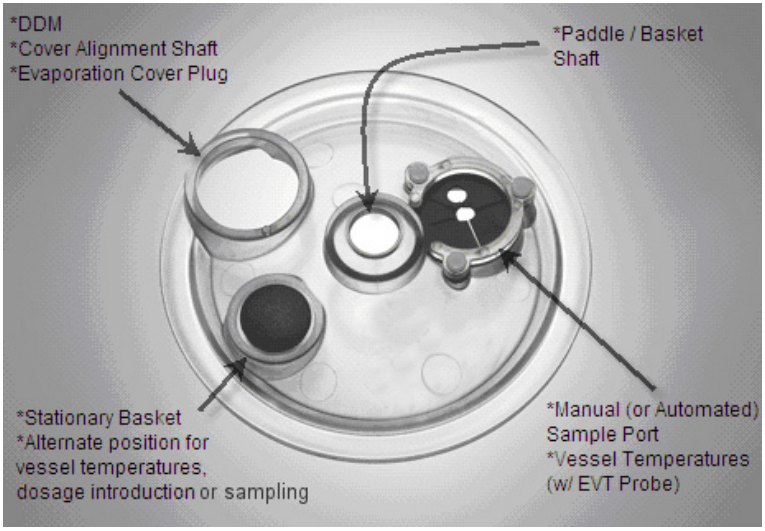

*DDM
*Cover Alignment Shaft
*Evaporation Cover Plug
*Paddle / Basket Shaft
*Stationary Basket
*Alternate position for vessel temperatures, dosage introduction or sampling
*Manual (or Automated) Sample Port
*Vessel Temperatures (w/ EVT Probe)

Figure 27 Agilent 708-DS / 709-DS Standard Evaporation Cover

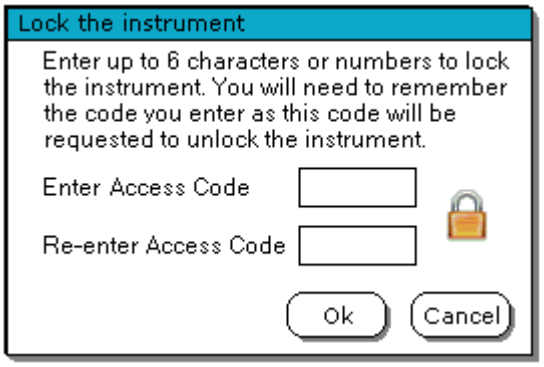
Main Screen - Manifold Up / Down

Press **Manifold** ▲ to raise the manifold to its highest position. You do not need to hold the button to fully raise the manifold.

Press **Manifold** ▼ to lower the manifold to the lowest position for the currently specified apparatus type. Setting the proper manifold depth for the appropriate volume and apparatus combinations is specified in "Menu Screen - Calibration" on page 87.

Main Screen - Lock

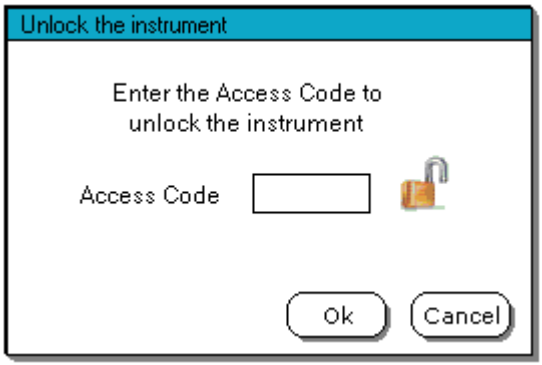
In order to lock the instrument, press . The Lock the instrument screen displays.


Lock the instrument
Enter up to 6 characters or numbers to lock the instrument. You will need to remember the code you enter as this code will be requested to unlock the instrument.
Enter Access Code
Re-enter Access Code
Ok
Cancel

Enter the access code, confirm it, and press **Ok**. The instrument returns to the Main screen and the Instrument Locked icon is displayed. Further changes to the instrument are prohibited until the instrument is unlocked or the power is cycled.

Main Screen - Unlock

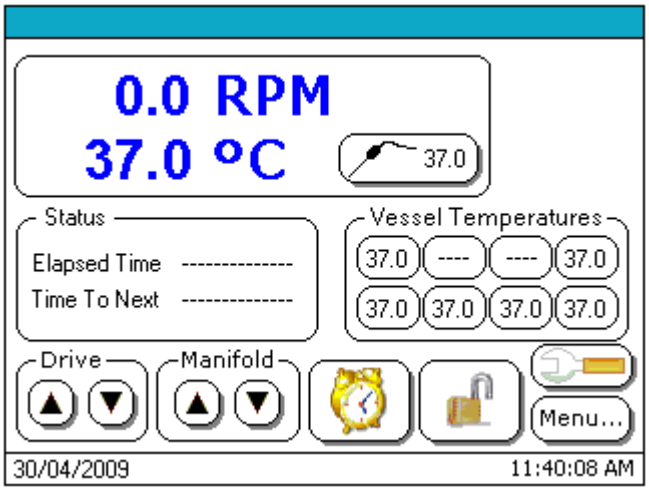
The icon indicates that the instrument is currently locked. In order to unlock the instrument, press . The Unlock the instrument screen displays requesting an access code:



Enter the access code and press **Ok**. The instrument returns to the Main screen and displays indicating that the system is unlocked. Full functionality of the instrument is now available through the front panel.

NOTE If you forget your access code, the only way to regain access is to cycle the power.

Main Screen - Remote Control



When the unit is being controlled remotely, the words Remote Control flash on the bottom of the screen, the Run / Stop button is not displayed, and the screen is locked. Although all other buttons are displayed, they are disabled.

Main Screen - Alarms

The alarm functions are accessed by pressing on the Main screen. This notification applies only to the basic Timer Alarm function. The icon is displayed only if a Timer Alarm duration has been entered and the timer duration has not elapsed.

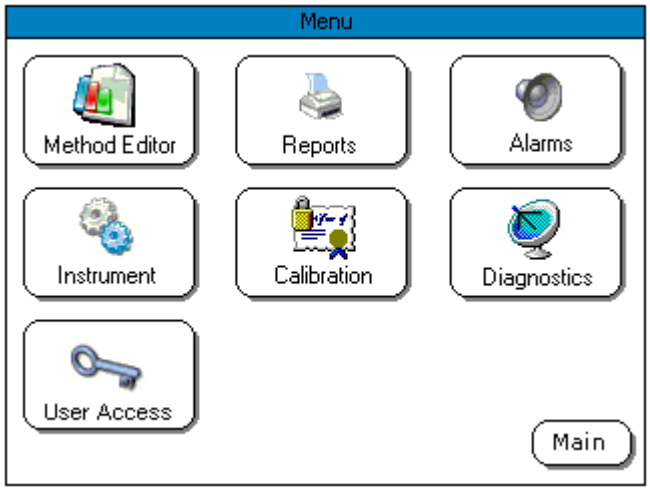
When the Timer Alarm duration elapses, an Alarm screen displays to notify the user and an alarm briefly sounds. The screen displays until you press **Ok**. See “Alarm Time Expired” on page 106

NOTE The Timer Alarm is provided as a convenience and does not affect the running of a manual test or an automated method. Other functions of the instrument may override the notification of the Timer Alarm if multiple events occur at the same time.

Main Screen - Maintenance Due Icon

When maintenance is due, a warning displays. Maintenance may include calibration or preventative Maintenance (“Instrument Calibration Due” on page 104). Once the warning has been acknowledged, the icon displays as a reminder until the maintenance occurs. This icon is displayed on the Main screen until the appropriate due date has been updated under **Menu** > **Calibration**. See “Menu Screen - Calibration Screen 1” on page 87

Menu Screen - System Menu

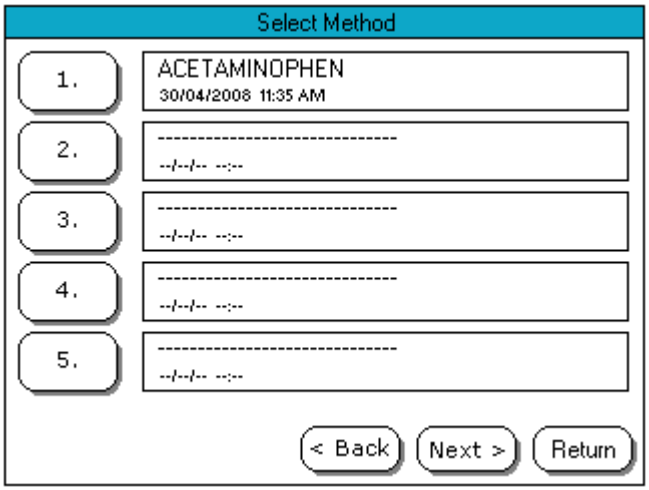


Press **Menu** from the Main screen to access the System Menu. The System Menu provides an entry point for setting various system parameters. Each of the different functions available through this screen (Method Editor, Reports, Alarms, Instrument, Calibration, and Diagnostics) is described in detail in the following sections:

Method Editor	**"Menu Screen - Method Editor" on page 68**
Reports	**"Menu Screen - Reports" on page 77**
Alarms	**"Menu Screen - Alarms" on page 80**
Instrument	**"Menu Screen - Instrument" on page 82**
Calibration	**"Menu Screen - Calibration" on page 87**
Diagnostics	**"Menu Screen - Diagnostics" on page 90**
User Access	**"Menu Screen - User Access" on page 95**

Menu Screen - Method Editor

The Method Editor allows you to create a new method, enter new method parameters, or modify an existing method.



Forty slots are allocated for storage of methods in system memory. In order to create a new method, select an empty memory slot, which is indicated by dashes in the name field. Tap an available method or slot. The Method Properties screen displays.

Method Properties Screen 1

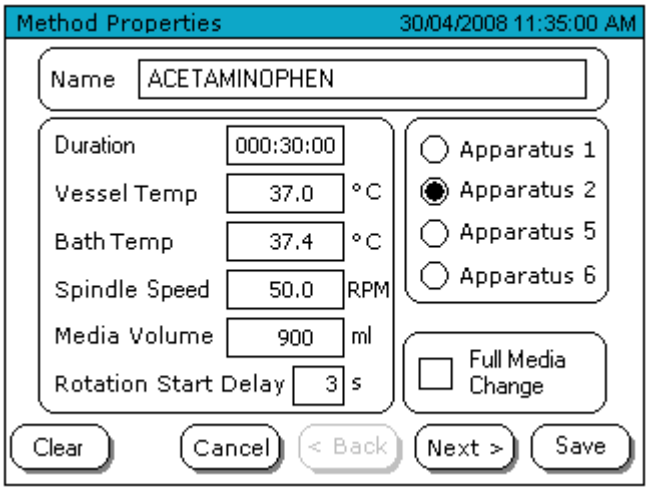


Table 2 Method Properties Screen 1

Option	Function
Name	32-character alphanumeric name used to describe the method.
Duration	The minimum time the method will take to run. The actual duration will be the value of this field or the sum of the final timepoint and final spin duration, whichever is greater.
Vessel Temp	Desired temperature of the vessels during a test.
Bath Temp	Desired temperature of the bath during a test.
Spindle Speed	Desired speed of the spindle during a test.
Media Volume	Volume of media in each vessel during a test.
Rotation Start Delay	Amount of time in seconds between the start of the test and the start of spindle rotation (maximum value of 10 seconds).
Apparatus Type	Currently installed apparatus.
Full Media Change	If this option is enabled, the elapsed time counter stops during a method pause. This allows for time to change the media. The elapsed time counter resumes counting when the method is resumed. If this option is not enabled, the elapsed time counter continues counting during a pause. If the Pause Duration Alarm time is exceeded, an alarm occurs.

From the Method Properties screen:

- Press **Clear** > **Yes** to return all method parameters to default values and return to the Select Method screen.
- Press **Cancel** to exit the routine without saving the values and return to the Select Method screen.
- Press **Save** to save the values to permanent memory and return to the Select Method screen.
- Press **Next** to save all values to permanent memory and proceed to the next Method Properties screen.

Method Properties Screen 2

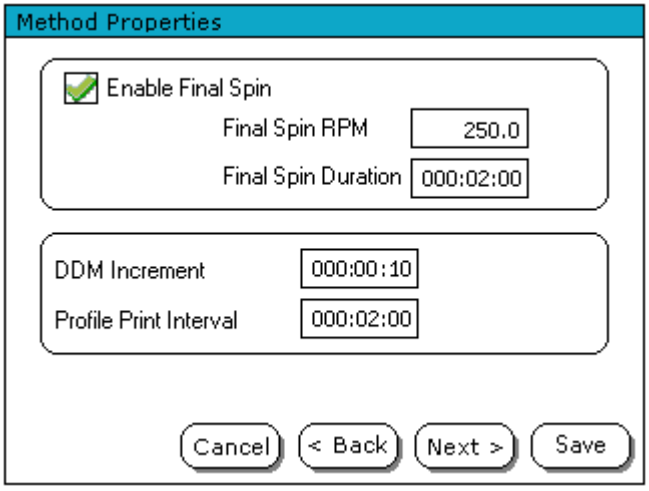


Table 3 Method Properties Screen 2

Option	Function
Enable Final Spin	Enables the final spin.
Final Spin RPM	Allows for spindle rotation at a speed different from the previous spindle speed.
Final Spin Duration	Duration of the final spindle speed setting.

Table 3 Method Properties Screen 2

Option	Function
DDM Increment	This is the time, in seconds, between successive tablet drops. Tablets are dropped starting with position one and continuing through the highest position installed (6 or 8).
Profile Print Interval	This parameter controls the frequency that the spindle speed and temperature are printed. Entering a zero disables this function. Data is entered as hours:minutes:seconds.

From the Method Properties screen:

- Press **Cancel** to exit the routine without saving the data and return to the Select Method screen.
- Press **Back** to save all values to permanent memory and return to the previous Method Properties screen.
- Press **Save** to save all values to permanent memory and return to the Select Method screen.
- Press **Next** to save all values to permanent memory and proceed to the next Method Properties screen.

Method Properties Screen 3

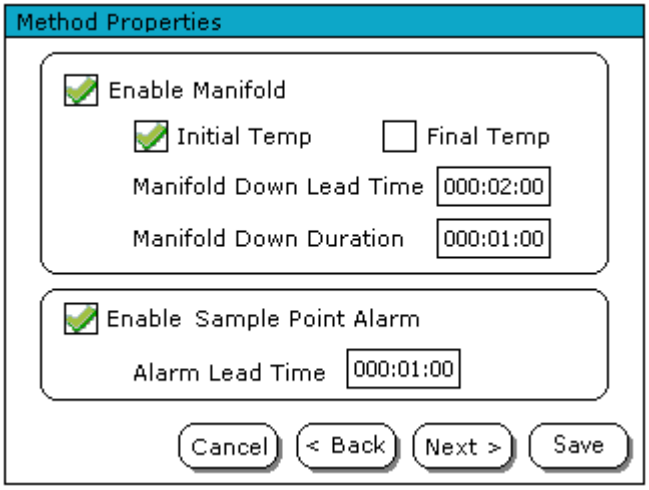


Table 4 Method Properties Screen 2

Option	Function
Enable Manifold	Enabling this option activates the optionally installed sampling manifold. The manifold lowers the sampling probes into the solution, allowing automated sample collection as well as the temperature probes for automated temperature measurement.
Initial Temp	Enables recording and printing of the initial test temperature.
Final Temp	Enables recording and printing of the final test temperature.
Manifold Down Lead Time	This is the amount of time that the manifold lowers prior to the sample time point. This allows for equilibration of the temperature probes before vessel temperature measurement and for priming the system when an external pump is connected.
Manifold Down Duration	This is the amount of time that the manifold remains at its sampling position. The sum of the Lead Time and Duration must be greater than or equal to 30 seconds for accurate temperature readings.

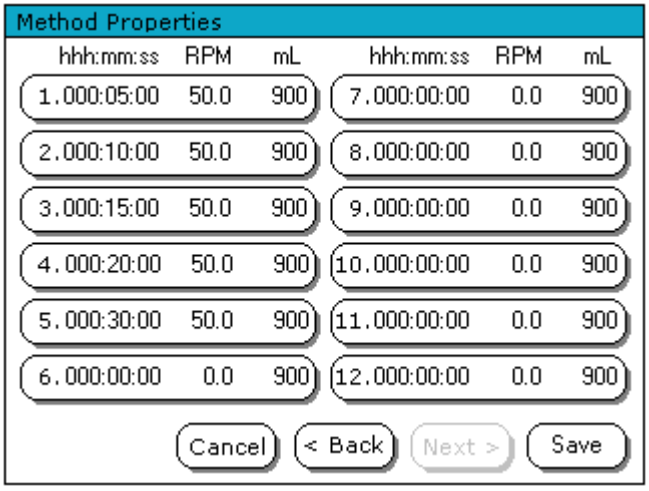
Table 4 Method Properties Screen 2

Option	Function
Enable Sample Point Alarm	Enabling this option activates the sample notification dialog as well as activating the audible and visual alarms. This alarm draws the operator to the machine at the timepoint for manual sampling scenarios.
Alarm Lead Time	The Time Point Approaching screen ("Time Point Approaching" on page 102) is available to notify the user of upcoming time points. The time entered is how long before the time point the Time Point Approaching screen displays. This alarm draws the operator to the machine at the timepoint for manual sampling scenarios.

From the Method Properties screen:

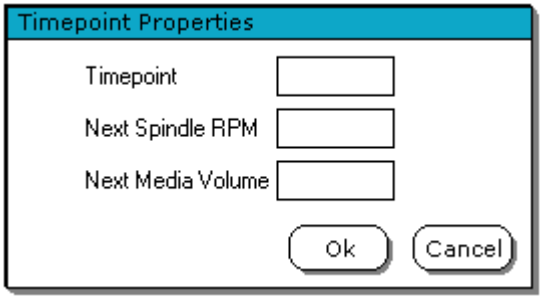
- Press **Cancel** to exit without saving the values and return to the Select Method screen.
- Press **Back** to save all values to permanent memory and return to the previous Method Properties screen.
- Press **Save** to save all values to permanent memory and return to the Select Method screen.
- Press **Next** to save all values to permanent memory and proceed to the next Method Properties screen.

Method Properties Screen 4



Using this Method Properties screen, you can specify up to twelve time points per test. These points specify when changes in spindle speed, collection of samples, and recording of data occur.

Specify a time point by pressing the button for the corresponding time point. The Timepoint Properties screen displays requesting the new spindle speed and time for when that time point will be executed.



You can enter a different RPM and vessel volume at each time point. The run report will print out the RPM that was running immediately before the time point. At the specified time point, the RPM will change (if applicable).

All time points are relative to the start of the test. A time point of 000:10:00 allows for a sample to be taken 10 minutes after the start of the test. If a second time point is entered as 000:25:00, the next sample point is programmed 25 minutes into the test.

From the Timepoint Properties screen:

- Press **Ok** to accept the Time point information.
- Press **Cancel** to abort the process and return to the Method Properties - Timepoints screen.

NOTE

If a time point overlap is noted during time point entry, a warning icon displays in the lower left of the Method Properties - Timepoints screen. Time point overlap typically occurs when the manifold down lead time plus the manifold down duration time exceeds the time point interval. Press the warning icon to display the Timepoint Overlap Error screen ("Timepoint Overlap Error" on page 110). The warning icon remains on the screen as long as there are time point errors. A method can be saved even it contains time point overlap errors.

WARNING

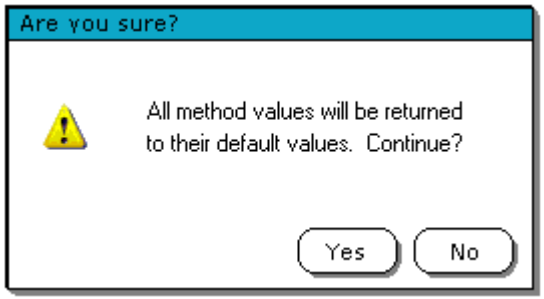
Methods that contain overlap errors do not execute properly.

If sample point alarms have been enabled, time points are announced via the Sample Point Alarm screen and an audible alarm.

From the Method Properties screen:

- Press **Cancel** to exit without saving the values and return to the Select Method screen.
- Press **Back** to save all values to permanent memory and return to the previous Method Properties screen.
- Press **Save** to save all values to permanent memory and return to the Select Method screen.

Method Cancel Dialog

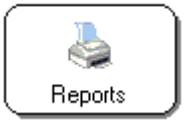


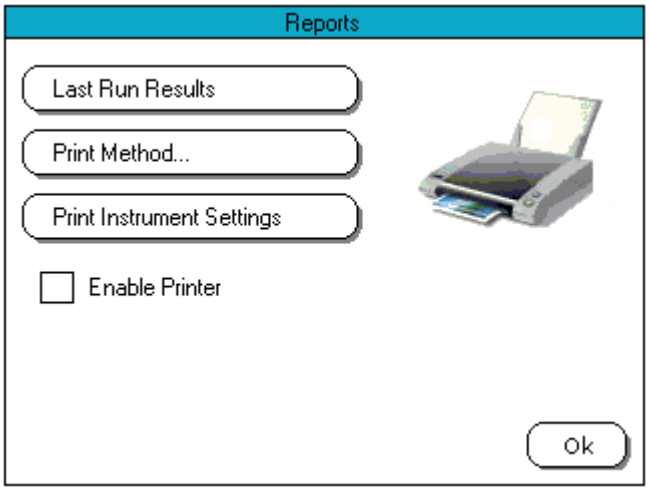
The Are you sure? screen displays when **Cancel** is pressed from one of the Method Properties screens. This option allows you to return to the Method Editor if Cancel is pressed inadvertently.

From the Are you sure? screen:

- Press **Yes** to return to the Select Method screen.
- Press **No** to return to the current Method Editor screen.

Menu Screen - Reports

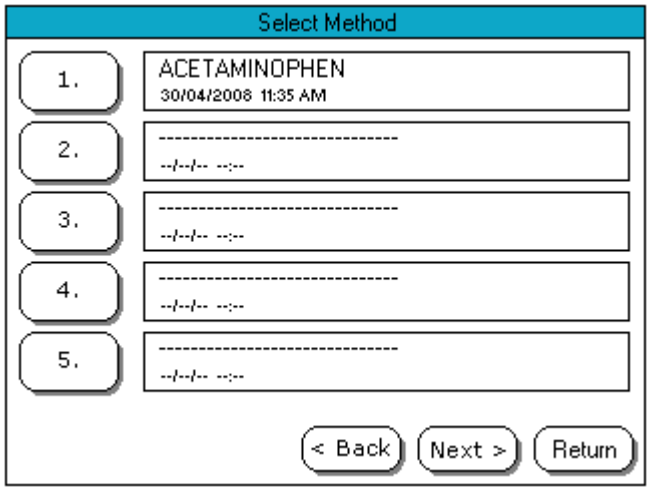




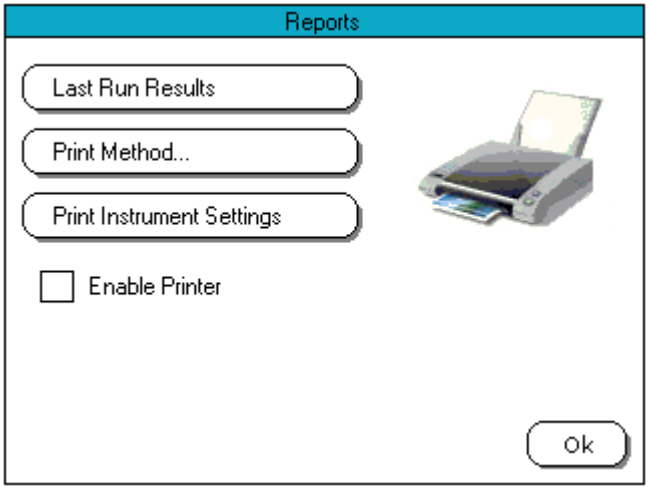
If a printer is installed, check **Enable Printer** to enable all printer functions. Un-check the box to disable printing.

- To print results from the last completed test, press **Last Run Results**.

- To print the contents of a method, press **Print Method**. The Select Method screen displays prompting you to select a method to print:

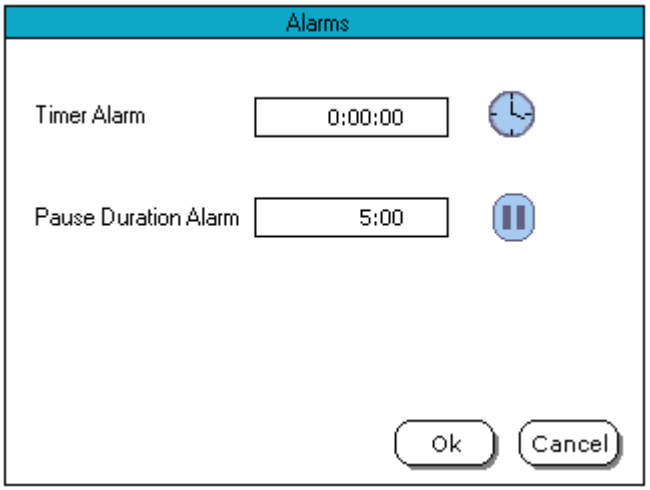


Available methods have a name associated with them. Methods that have not yet been configured have a series of dashes in the name field indicating available memory.



Press **Print Instrument Settings** to print all of the instrument configuration parameters and their current values. Press **Ok** to return to the Menu screen.

Menu Screen - Alarms



Two different alarms are available through the Alarms screen:

Table 5 Menu Screen - Alarms

Alarm	Function
Timer	This alarm functions as a countdown timer. Enter the duration as HH:MM:SS. Press **Ok** to start the timer. When the alarm duration expires, the Alarm Time Expired warning displays ("Alarm Time Expired" on page 106) and an audible alarm sounds. This alarm sounds until you press **Ok**. To cancel a previously running alarm before time has expired, enter 0 for the Timer Alarm value.
Pause Duration	This field allows you to set the maximum pause period while running a method. When a running method is paused, a timer starts. If the pause time exceeds this Pause Duration, the Pause Duration Exceeded error displays ("Pause Duration Exceeded" on page 110), an alarm sounds, and a message is sent to the printer. Entering a zero in this field disables the Pause Duration Alarm.

From the Alarms screen:

- Press **Ok** to enable the Timer Alarm and return to the Menu screen.
- Press **Cancel** to discard any changes and return to the Menu screen.

Menu Screen - Instrument

Menu Screen - Instrument Settings Screen 1

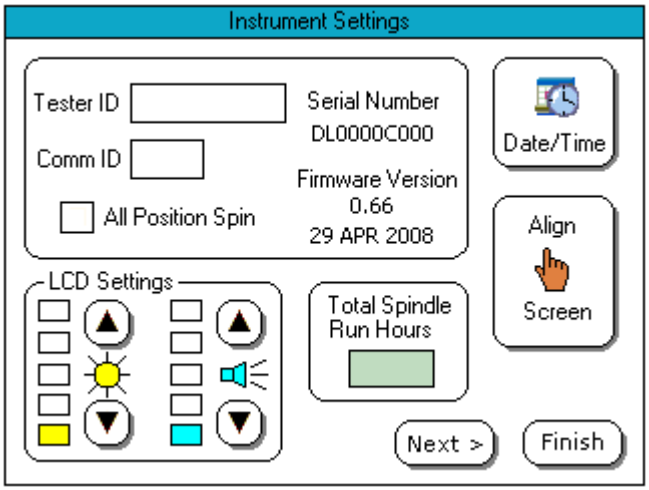


Table 6 Menu Screen - Instrument Settings Screen 1

Option	Function
Tester ID	A twelve-character field that helps identify the instrument. The Tester ID is printed out with the other system information during a test.
Comm ID	The address of the instrument on the communications bus. This address is used by external host programs to communicate with the instrument. The Comm ID may range from 01 to 99.
All Position Spin	Allows the spindle to rotate regardless of the position of the drive unit. This is useful when calibrating spindle speed as the spindle may rotate while the drive unit is in its upper position. If this option is not checked, the spindle only rotates when the drive unit is in its lowest position.

Table 6 Menu Screen - Instrument Settings Screen 1

Option	Function
Date / Time	Allows you to set the current date and time as well as set the desired format. Press the date format button to advance the date format to the next available format. Date formats are US (MM/DD/YYYY), ISO (YYYY/MM/DD) or Metric (DD/MM/YYYY). Time formats are either 12-hour (2:42:00 PM) or 24-hour (14:42:00).
Align Screen	Starts the touchscreen calibration routine. The screen prompts you to press three different circles in succession to calculate the calibration. To verify calibration, press the 4 circles in the screen corners. Multiple Xs normally display in each circle. Touchscreen calibration values are stored in permanent memory for further use. If the touchscreen calibration was entered inadvertently, do not touch the screen. After a 5-second delay, the calibration routine aborts and the touchscreen calibration is not changed.
LCD Settings	Sets the screen brightness and the audio feedback volume. Pressing either Up arrow increases the desired value. The corresponding bar graph increases to reflect the new setting. Pressing the Down arrow decreases the values.

From the Instrument Settings screen:

- Press **Finish** to return to the Menu screen. All values are stored in permanent memory.
- Press **Next** to advance to the next Instrument Settings screen.

Menu Screen - Instrument Settings Screen 2

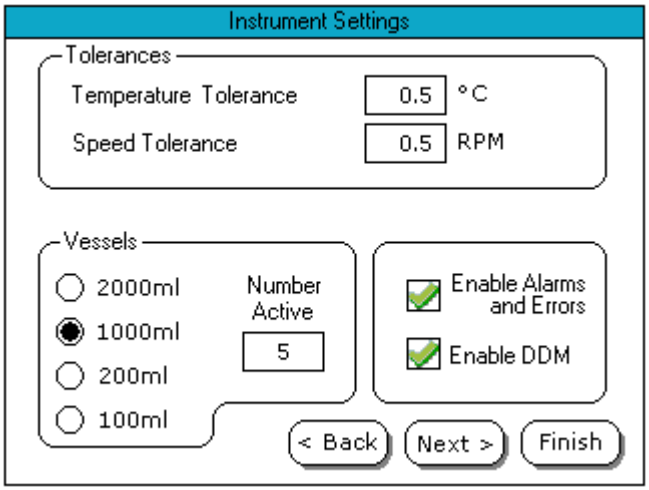


Table 7 Menu Screen - Instrument Settings Screen 2

Option	Function
Temperature Tolerances	Allowable temperature variation from the set point. When alarms are enabled in Instrument Settings, deviations greater than this will cause an alarm but not stop the method.
Speed Tolerance	Allowable spindle speed variation from the set point. When alarms are enabled in Instrument Settings, deviations greater than this cause an alarm but do not stop the method.
Vessels	This parameter sets the current installed vessel size (2000 mL, 1000 mL, 200 mL, or 100 mL). This is used to set user prompts in other places throughout the operation of the instrument.
Number Active	Sets the number of vessels used in a test. For example, a 6-vessel configuration may only use the first four vessels if this parameter is set to 4. The remainder of the vessels are ignored until this parameter is changed.
Enable Alarms	If checked, all alarms are activated. If not checked, all alarms are suppressed on the user interface and on a printout if a printer is installed.
Enable DDM	Enables the Dosage Delivery Modules. This setting overrides the method setting. If DDM is not enabled, the DDM Increment box is grayed out in Method Editor.

From the Instrument Settings screen:

- Press **Back** to return to the previous Instrument Settings screen.
- Press **Finish** to save all settings and return to the Menu screen.
- Press **Next** to advance to the next Instrument Settings screen.

Menu Screen - Instrument Settings Screen 3

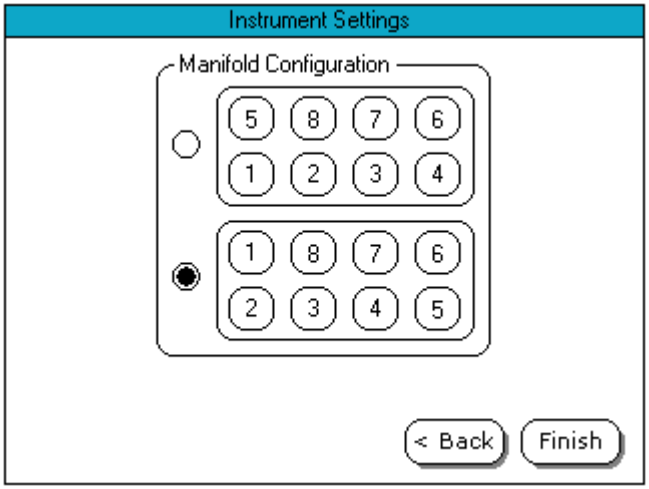


Table 8 Menu Screen - Instrument Settings Screen 3

Option	Function
Manifold Configuration	Selects the numbering scheme to be used throughout testing.

From the Instrument Settings screen:

- Press **Back** to return to the previous Instrument Settings screen.
- Press **Finish** to save all settings and return to the Menu screen.

Menu Screen - Instrument Settings Screen 4

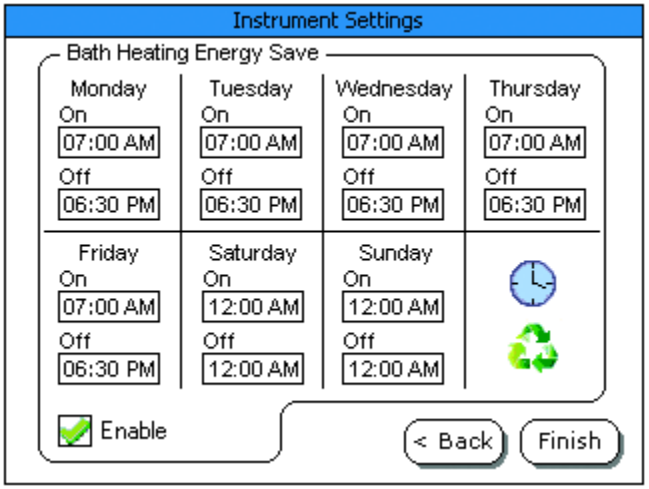


Table 9 Menu Screen - Instrument Settings Screen 3

Option	Function
Bath Heating Energy Save	Enable this option to program the power-save feature for the heater/circulator (708-DS only). Heater/circulator on and off times can be specified to conserve energy and reduce stress on the components of the unit.

From the Instrument Settings screen:

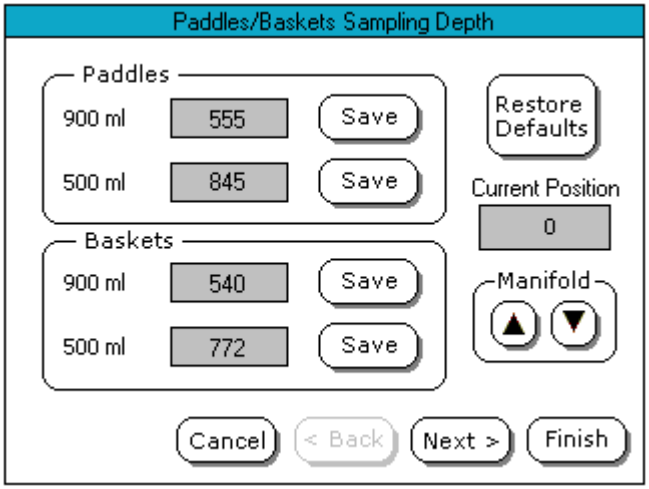
- Press **Back** to return to the previous Instrument Settings screen.
- Press **Finish** to save all settings and return to the Menu screen.

Menu Screen - Calibration

Menu Screen - Calibration Screen 1

The Calibration screen allows you to fine-tune the height of the manifold for Apparatus 1 (Baskets) and Apparatus 2 (Paddles). The volumes shown change based on the installed vessel size set in Instrument Setting Screen 2 (“Menu Screen - Instrument Settings Screen 2” on page 84). The following vessel size ranges are configurable:

Size	Max	Min
2L	2000 mL	1650 mL
1L	900 mL	500 mL
200 mL	200 mL	150 mL
100 mL	100 mL	80 mL



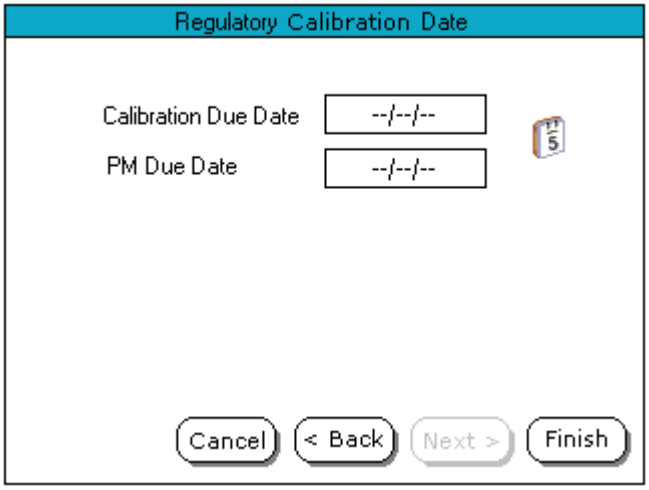
Each of the gray boxes contains a numeric value. The value is the sampling location of the manifold as measured from its home position. These values range from 0 at home to 999 at the manifold's lowest position. If no values have ever been entered, the default values, protected in the firmware, are shown for each Apparatus. If previous values have been entered, these are displayed. Default values for a 1L system are shown in the screen shot.

To set a new position, press **Manifold** ▲ or **Manifold** ▼ to raise or lower the manifold. The manifold will move as long as the button is held. The current location of the manifold is displayed above **Manifold** ▲▼. Once the desired position is reached, press **Save** on the corresponding field. This updates the display for that field.

From the Paddles/Baskets Sampling Depth screen:

- Press **Restore Defaults** to replace all of the displayed values with the default values, which are protected in the firmware.
- Press **Cancel** to exit the routine without saving the values and return to the Menu screen.
- Press **Finish** to save all values to permanent memory and return to the Menu screen.
- Press **Next** to save all values to permanent memory and proceed to the next Calibration screen.

Menu Screen - Calibration Screen 2



Calibration and Preventative Maintenance due dates may be entered on the Regulatory Calibration Date screen. A reminder displays over the Main screen to indicate that calibration or maintenance is required. You must develop your own Calibration and Preventative Maintenance schedules.

From the Regulatory Calibration Date screen:

- Press **Cancel** to exit the routine without saving the values and return to the Menu screen.
- Press **Back** to save all values to permanent memory and return to the previous Calibration screen.
- Press **Finish** to save all values to permanent memory and return to the Menu screen.

Menu Screen - Diagnostics

Menu Screen - Diagnostics Screen 1

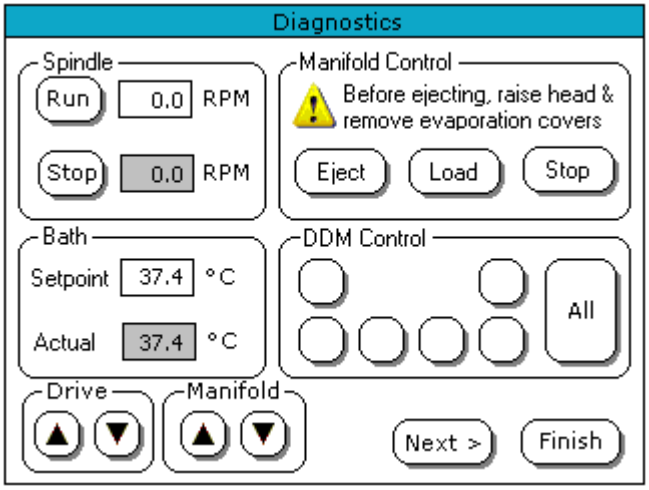


Table 10 Menu Screen - Diagnostics Screen 1

Option	Function
Spindle	Allows control of the spindle. Press the block next to Run and enter the desired RPM. Press **Run** to start the spindle and press **Stop** to stop the spindle. The actual RPM displays in the gray block below the RPM set point.
Bath	Allows control over the bath temperature. Press the block next to Setpoint and enter the desired temperature in the open field that displays. Press **Ok** to activate the temperature controller until the set point temperature is reached. The actual temperature is displayed in the gray block below the set point temperature.

Table 10 Menu Screen - Diagnostics Screen 1

Option	Function
Manifold Control	The manifold may be ejected for cleaning and maintenance. Before ejecting, raise the head, disconnect the two thermistor cables, remove the tubing from the tubing clamps, and remove the evaporation covers. Press **Eject** to lower the manifold until it is free. To reattach the manifold, insert it into the guides and gently lift it up while pressing **Load**. Release the manifold once it begins to rise on its own. Press **Stop** to stop all manifold motion.
Dosage Delivery Module Control	The DDMs are solenoid activated doors that hold a tablet above each vessel. Press the corresponding button to open a DDM. Press **All** to open all DDMs simultaneously.
Drive	Press **Drive** ▲ to raise the drive unit. Keep pressing it to raise the drive unit to the maximum height. Release the button to stop the motion. Press **Drive** ▼ to lower the drive unit.
Manifold	Press **Manifold** ▲ to raise the manifold to the maximum height. Press **Manifold** ▼ to lower the manifold to the appropriate position based on the apparatus type and volume.

From the Diagnostics screen:

- Press **Next** to proceed to the second Diagnostics screen.
- Press **Finish** to return to the Menu screen.

Menu Screen - Diagnostics Screen 2

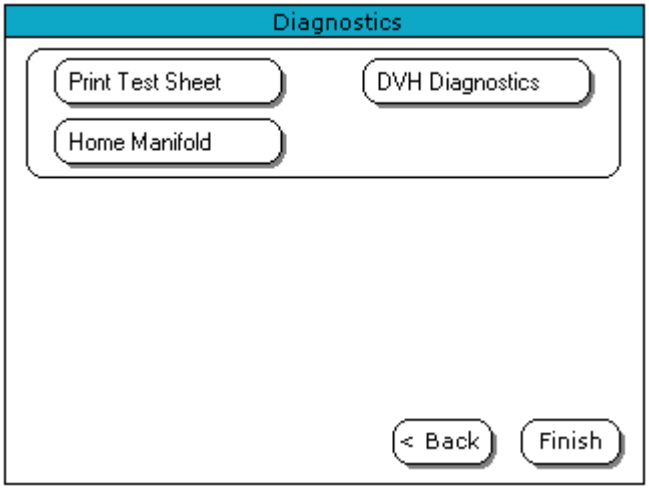


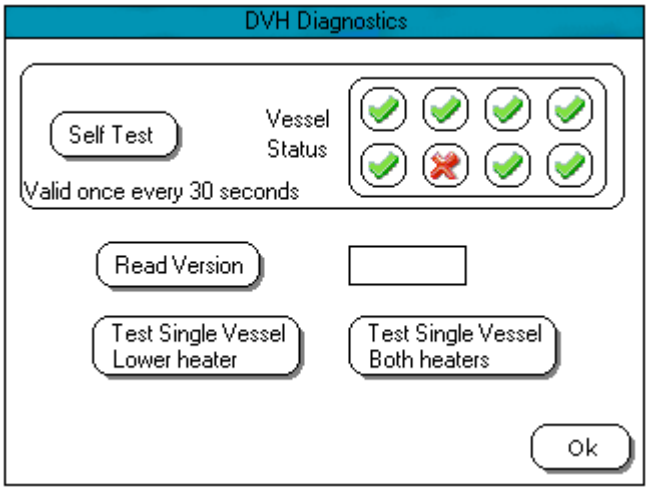
Table 11 Menu Screen - Diagnostics Screen 2

Option	Function
Print Test Sheet	Sends a test message to the printer. A printer is required for this option.
DVH	Opens a new window with the operational parameters of the Direct Vessel Heating module. If the DVH is not installed (Agilent 708-DS), this button is disabled.
Home Manifold	Automatically returns the sample manifold to its home (fully raised) position.

From the Diagnostics screen:

- Press **Back** to return to the previous Diagnostics screen.
- Press **Finish** to return to the Menu screen.

Diagnostics - DVH Diagnostics Screen 1



When a self test is requested, a green check mark displays as each vessel passes the self test. If a self test fails, a red X displays. On systems with less than 8 vessels installed, the extra positions remain blank.

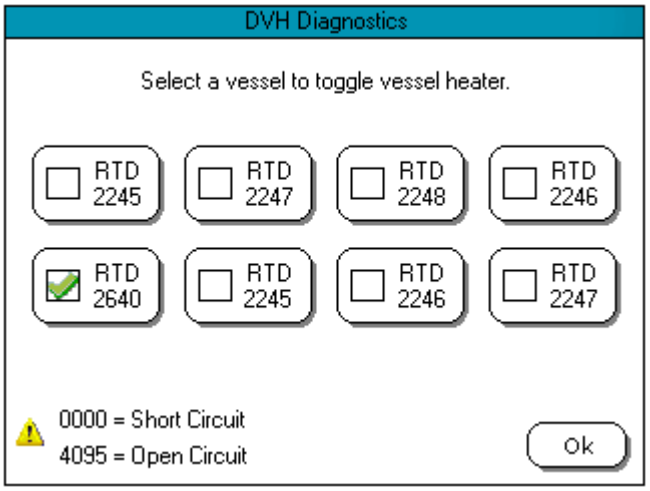
Table 12 Diagnostics - DVH Diagnostics Screen 1

Option	Function
Read Version	**Displays the firmware version of the DVH Control Box.**

From the DVH screen:

- Press **Ok** to return to the main Diagnostics screen.
- Press **Test Single Vessel Lower heater** or **Test Single Vessel Both heaters** to proceed to DVH Diagnostic Screen 2.

Diagnostics - DVH Diagnostics Screen 2



The DVH screen displays a button for each vessel position. If Test Single Vessel Lower heater was selected on the previous screen, press a button to turn on the lower heater for a vessel. If Test Single Vessel Both heaters was selected on the previous screen, press a button to turn on both heaters. When a heater is active, a green check mark displays in the corresponding vessel button. Once the heaters are turned on, the value of the RTD starts to increase as the temperature rises.

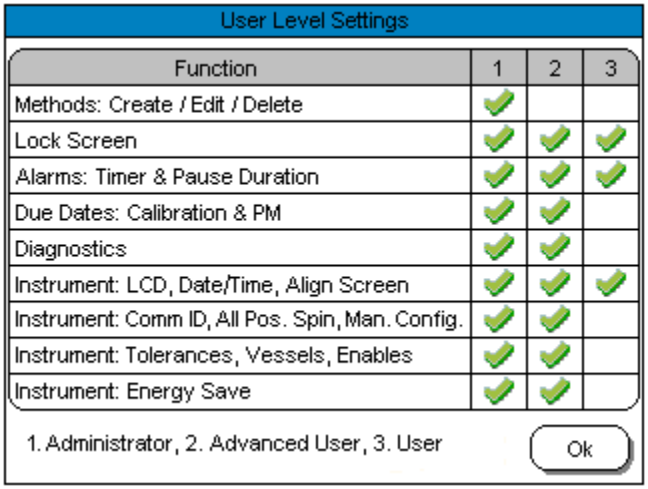
NOTE

For safety reasons, the heaters are only provided with 15% of maximum power.

From the DVH screen:

- Press **Ok** to return to the main DVH Diagnostics screen.

Menu Screen - User Access



You can use user levels to restrict changes to specific instrument settings and method parameters. Three levels of access are provided:

- Administrator
- Advanced User
- User

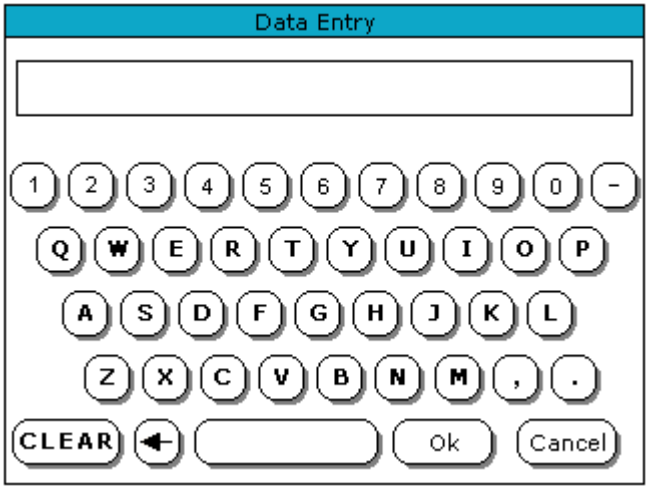
NOTE You can customize each user access level, but changes can only be made when the instrument is in Administrator mode.

From the User Level Settings screen:

- Press **Ok** to return to the previous window.

General 708-DS / 709-DS Conventions

Alphanumeric Data Entry

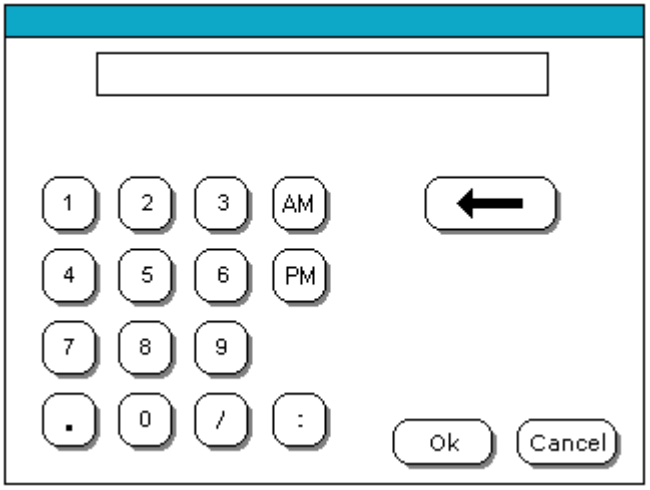


The Data Entry screen acts as on-screen keyboard for the instrument. The left arrow functions as a backspace key. Spaces, periods, and dashes are provided as usable characters.

From the Data Entry screen:

- Press **CLEAR** to remove all characters from the open field.
- Press **Ok** to return to the previous window. The data entered is returned and placed in the appropriate data entry box.
- Press **Cancel** to clear the entered data and return to the previous window.

Numeric and Time / Date Entry



This screen is a specialized subset of the alphanumeric data entry screen. It has been optimized for numeric, date, and time data entry. As keys are pressed, they display in the upper box of the display. The valid data entry range and the previous data entry will be shown just below the display. The maximum valid data string length is 25 characters. Special function keys are defined below:

Table 13 Numeric and Time / Date Entry

Option	Function
←	Backspaces and deletes one character every time it is pressed.
/	Used as separator in date entries.
:	Used as separator in time entries.
AM	Designates morning when entering time in 12-hr format.
PM	Designates afternoon when entering time in 12-hr format.

From the Numeric and Time / Date Entry screen:

- Press **Ok** to return to the previous window. The data entered is returned and placed in the appropriate data entry box.

Parameter Limits / Ranges

Table 14 Parameter Limits / Ranges

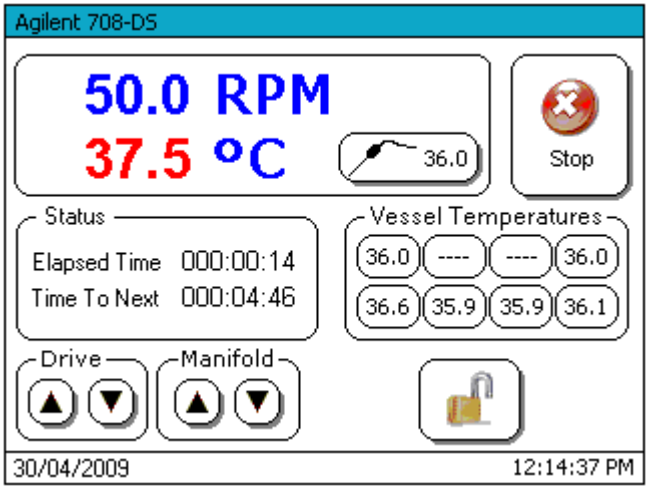
Parameter	Range	Resolution	Configured
Spindle Speed	10.0 - 250.0 RPM	0.1 RPM	"Main Screen - Display Parameters" on page 48 "Run - Manual Operation (708-DS)" on page 54 "Method Properties Screen 1" on page 69 "Menu Screen - Diagnostics Screen 1" on page 90
Temperature (Bath or Vessel)	25 - 55 ºC	0.1 ºC	"Main Screen - Display Parameters" on page 48 "Method Properties Screen 1" on page 69 "Menu Screen - Diagnostics Screen 1" on page 90
Serial Number	15 characters		Factory
Profile Print Interval	000:01:00 to 024:00:00	1 second	"Run - Manual Operation (708-DS)" on page 54 "Method Properties Screen 2" on page 70
Test Duration	000:00:10 to 999:59:59	1 second	"Run - Manual Operation (708-DS)" on page 54 "Method Properties Screen 3" on page 72
Final Spin Duration	000:00:10 to 001:00:00	1 second	"Method Properties Screen 2" on page 70
Tester ID	12 characters		"Menu Screen - Instrument Settings Screen 1" on page 82
Comm ID	01 to 99	01	"Menu Screen - Instrument Settings Screen 1" on page 82
Media Volume	100 to 2000 mL	1 mL	"Run - Manual Operation (708-DS)" on page 54 "Method Properties Screen 1" on page 69
DDM Increment	000:00:00 to 001:39:59	1 second	"Run - Manual Operation (708-DS)" on page 54 "Method Properties Screen 2" on page 70
Temp Error Tolerance	0 to ±0.5 ºC	1 second	"Menu Screen - Instrument Settings Screen 2" on page 84 **Note:** A value of 0 disables the tolerance check.
Speed Error Tolerance	0 to 1.0 RPM	1 second	"Menu Screen - Instrument Settings Screen 2" on page 84 **Note:** A value of 0 disables the tolerance check.
Manifold Down Time	000:00:00 to 001:00:00	1 second	"Method Properties Screen 3" on page 72

Table 14 Parameter Limits / Ranges

Parameter	Range	Resolution	Configured
Manifold Lead Time	000:00:00 to 000:01:00	1 second	"Method Properties Screen 3" on page 72
Sample Point Alarm	000:00:05 to 000:02:30	1 second	"Method Properties Screen 3" on page 72
Method Pause Time	00:00 to 1:00:00	1 second	"Menu Screen - Alarms" on page 80
Timer Alarm	00:00 to 24:00:00	1 second	"Menu Screen - Alarms" on page 80

Agilent 708-DS / 709-DS Notifications

Main Screen - Error Conditions



Tolerance limit monitoring is enabled when the spindle starts moving and the bath starts heating. Any fluctuations beyond the tolerance limits cause the corresponding displayed value to turn from blue to red and a dialog box with the corresponding error message to be displayed.

More critical errors are displayed on a separate error screen. These errors may include the following:

- Bath temperature out of tolerance
- Bath probe open circuit
- Bath probe short circuit
- Heater probe open circuit
- Heater probe short circuit
- Heater to bath probe offset > 6º. For this error, it is important to disable the heater to prevent potential damage due to a dry system.
- Spindle speed error if the set speed and actual speed differ by a value greater than the spindle speed tolerance.

If an error occurs during a test, you must clear the error screen manually. Clearing the error screen also clears the audible alarm. If a printer is installed and alarms are enabled in the Instrument Settings, the error condition is printed for record keeping.

Dialog Screens (Green / Blue)

Table 15 Dialog Screens (Green / Blue)

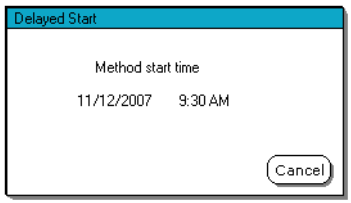
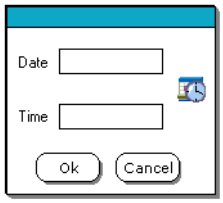
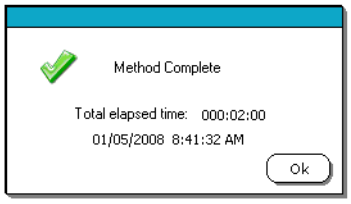
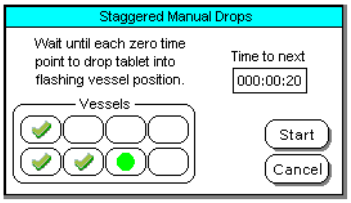
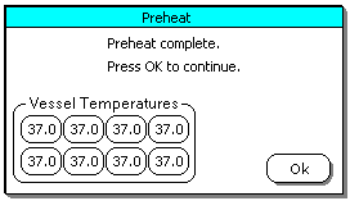
	**Delayed Start Dialog** The Delayed Start screen displays when a delayed start time has been entered ("Method - Start Options" on page 52). The date and time when the method starts is displayed on the screen. Access to the remainder of the instrument functions is prohibited until the method has finished. Press **Cancel** to stop the loaded method and return to the Main screen.
	**Delayed Start Date / Time Dialog** Displays when Time Delayed Start has been selected ("Method - Start Options" on page 52). Press the box beside either the Date or Time prompts to display the Numeric and Date and Time Entry screen ("Numeric and Time / Date Entry" on page 97). Press **Cancel** to abort the process and return to the previous screen.
	**Method Completion** The Method Completion screen displays when a method has completed. The total elapsed time, current date, and time the method completed is displayed. Press **Ok** to return to the Main screen.
	Time Point Approaching Displays when a sample point is approaching ("Method Properties Screen 4" on page 74). The time to the next sample point is indicated on the screen. Press **Ok** to clear the dialog and return to the Main screen. If no action is taken, this screen clears itself when 0 seconds is reached.

Table 15 Dialog Screens (Green / Blue)

	**Staggered Manual Drops** The Staggered Manual Drops screen provides a visual indication of when to drop tablets for manual introduction.
	**Preheat Complete** Displays when the preheat process has completed.

Warning Screens (Yellow)

Table 16 Warning Screens (Yellow)

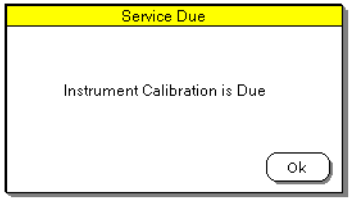
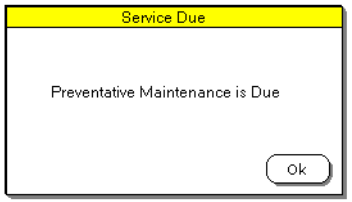
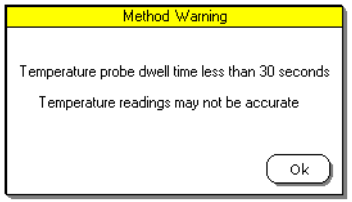
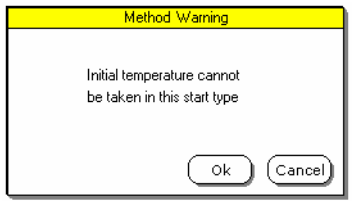
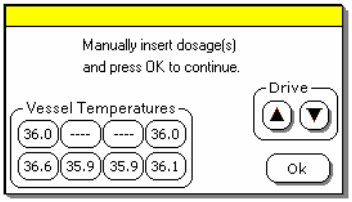
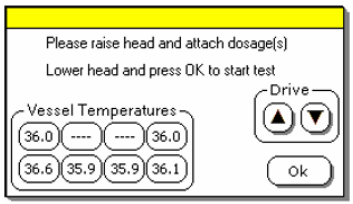
	**Instrument Calibration Due** This Service Due warning displays when the instrument is due for calibration ("Menu Screen - Calibration Screen 1" on page 87). Press **Ok** to clear the warning.
	**Instrument Preventative Maintenance Due** This Service Due warning displays when the instrument is due for preventative maintenance ("Preventive Maintenance" on page 116). Press **Ok** to clear the warning.
	**Temperature Probe Dwell Time Warning** This Method Warning screen displays when an Auto Sampling Manifold is installed and enabled ("Method Properties Screen 3" on page 72). If the sum of the Manifold Down Duration and Manifold Lead Time ("Method Properties Screen 3" on page 72) are less than 30 seconds, this screen displays. Press **Ok** to clear the warning.
	**Invalid Initial Temperature Warning** This Method Warning screen displays only when Apparatus 1 (basket) or Apparatus 6 (rotating cylinder) are installed and a Bath Temperature Start is selected from the Start Options screen ("Method - Start Options" on page 52). Press **Ok** to clear the warning and start the method without the initial temperature being taken. Press **Cancel** to abort the run and return to the Main screen.

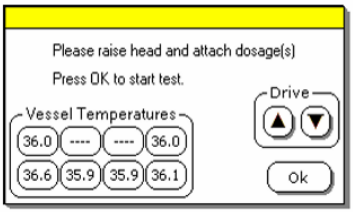
Table 16 Warning Screens (Yellow)



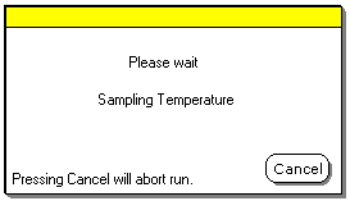
Load Dosage Prompt

This first warning displays when Apparatus 2 (paddle) or Apparatus 5 (paddle over disk) are being used. It indicates that it is time to lower the samples into the vessels. Press **Ok** to clear the dialog and continue the run. Drive ▲▼ displays only on units equipped with an automated drive unit.





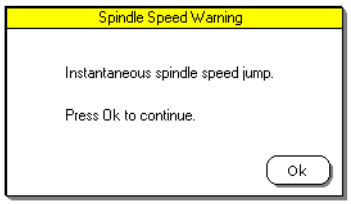
The next two warnings are applicable to systems configured as Apparatus 1 (basket) or Apparatus 6 (rotating cylinder). They indicate that it is time to attach the samples to the shafts. A manual drive unit displays the second warning and an apparatus with an automated drive unit displays the third warning. Press **Ok** to clear the dialog and continue the run. Drive ▲▼ displays only on units equipped with an automated drive unit.



Temperature Sampling Notification

This warning displays only when an Auto Sampling Manifold is installed. The warning displays while the temperature probes are immersed in the vessel media and clears itself once the temperature has been read. Press **Cancel** to abort the method and return to the Main screen.

Table 16 Warning Screens (Yellow)

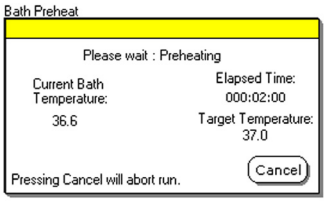


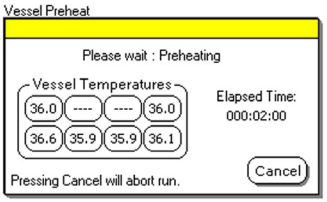
Instantaneous Spindle Speed Jump

If the spindle speed varies by more than 2% over a 40-msec interval, the Spindle Speed Warning screen displays.

Caution (Stop): The most common cause of this error is a shaft being held while performing diagnostics.

Press **Ok** to return to the Diagnostics screen.





Preheating Notification

This warning displays during preheating for Vessel or Bath selected start options. The warning changes to reflect the current configuration of the system. Current bath or vessel temperatures are displayed during preheating. Press **Cancel** to abort the run and return to the Main screen.

Alarm Time Expired

Displays when the Timer Alarm has expired (“Main Screen - Alarms” on page 65). Press **Ok** to clear the warning.

Table 16 Warning Screens (Yellow)

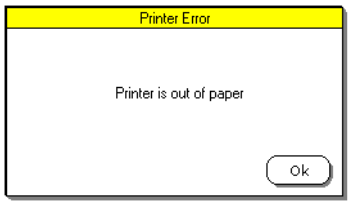
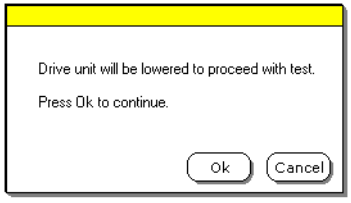
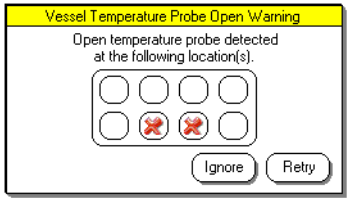
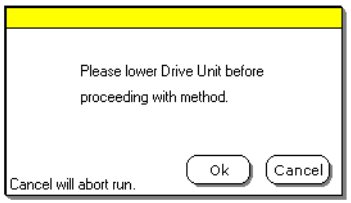
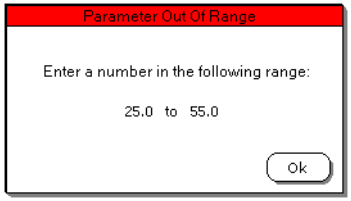
	**Out of Paper Notification** This warning is applicable to systems with a printer installed. This warning does not interrupt a running method. If the printer runs out of paper during a run ("Printer Maintenance" on page 127), the results may be printed out by selecting **Menu** > **Reports** > **Last Run Results** ("Menu Screen - Reports" on page 77). Press **Ok** to clear the warning.
	**Automated Drive Unit Movement Warning** Applies to systems with automated drive units. It indicates that you must move the drive unit to its lowest position to continue a run. Press **Ok** to lower the drive unit to its lowest position. Press **Cancel** to abort the current method and return to the Main screen.
	**Temperature Probe Open Warning** Indicates that one or more temperature probes have failed. A red X is placed in the appropriate space indicating which probe(s) have failed. **Note:** The unit may require service. Refer to the *Agilent 708-DS / 709-DS Service Manual* for troubleshooting. Press **Retry** to re-test the probes. Press **Ignore** to clear the warning.

Table 16 Warning Screens (Yellow)

	**Lower Drive Unit Notification** Displays on systems with manual drive units. It indicates that the drive unit must be fully lowered before any testing may proceed ("Manual Drive Unit Up / Down" on page 60). Press **Ok** to retest for the fully lowered position. If the drive unit is not fully lowered, the apparatus beeps and the warning remains on screen. Once the drive unit is in the fully lowered position, press **Ok** to continue the run. Press **Cancel** to abort the current run.
	Raise Drive Unit Notification Displays on systems with manual drive units ("Manual Drive Unit Up / Down" on page 60). It indicates when it is permissible to raise the drive unit. Press **Ok** to continue a run. Press **Cancel** to abort the current run.

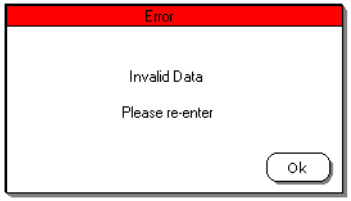
Error Screens (Red)

Table 17 Error Screens (Red)



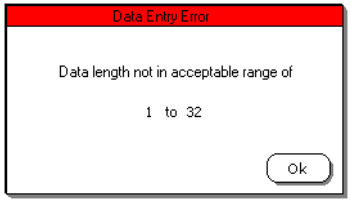
Parameter Out of Range

The Parameter Out of Range error displays when a parameter has been entered that is outside the valid range. The range minimum and range maximum are displayed. This provides an acceptable range and resolution of the data. Press **Ok** to clear the error.



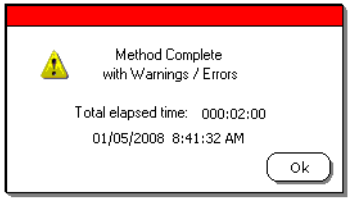
Invalid Data Error

The Invalid Data Error screen displays when unexpected data is encountered. Press **Ok** to clear the error.



String Length Exceeded

The Data Entry Error displays when a parameter has exceeded the maximum number of characters for that field. The minimum and maximum number of characters are displayed. Press **Ok** to clear the dialog.



Method Complete with Errors

This error displays after a method has completed and warnings or errors have occurred. The warnings or errors are presented through dialog screens. If a printer is installed, the warning or errors are printed. Press **Ok** to clear the dialog.

Table 17 Error Screens (Red)

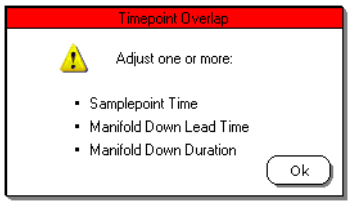
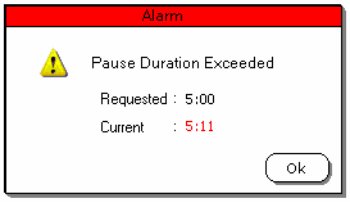
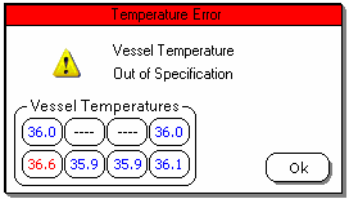
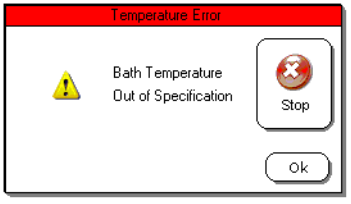
	**Timepoint Overlap Error** The Timepoint Overlap error screen displays when the time point start times entered do not provide sufficient time for all operations to perform before the next time point is due. This error typically occurs when the manifold lead time plus the manifold down time exceeds the time point interval. See “Method Properties Screen 4” on page 74 to correct the overlap. Press **Ok** to clear the error.
	**Pause Duration Exceeded** The Alarm error screen displays when the pause duration alarm time has been exceeded (“Menu Screen - Alarms” on page 80). Press **Ok** to clear the dialog.
	**Vessel Temperature Error** Displays when a vessel temperature has exceeded the allowable tolerance range (“Menu Screen - Instrument Settings Screen 2” on page 84). The vessel temperatures are displayed in blue if they are within tolerance. They are red if they are outside the allowed tolerance range. Press **Ok** to continue the run.
	**Bath Temperature Error** The Temperature Error screen displays when the bath temperature has exceeded the allowable tolerance range (“Menu Screen - Instrument Settings Screen 2” on page 84). Press **Stop** to abort the current method and return to the Main screen. Press **Ok** to continue the run.

Table 17 Error Screens (Red)

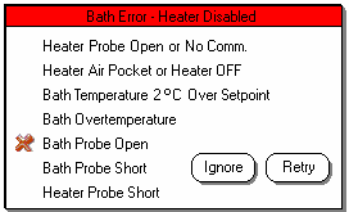
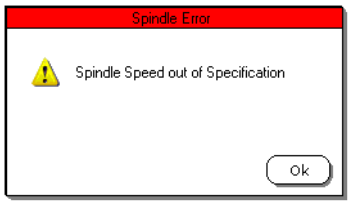
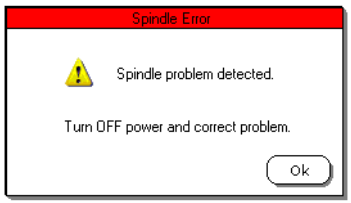
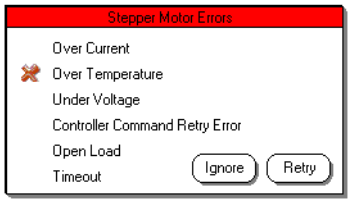
	**Bath Heater Error** The Bath Error - Heater Disabled screen shows all of the possible errors associated with the bath heater and the bath probe. A red X displays before the current error condition. If a bath heater error is encountered, the current running method is not stopped and you are given the option of correcting the error and continuing the test. Press **Retry** to retest for the error. If the error has been corrected, the dialog clears and you are returned to the Main screen. Press **Ignore** to ignore the error until the unit is powered on / off again.
Bath Heater Error	• Action
Heater Probe Open or No Comm.	• Ensure the bath heater cable is connected. • Check cable.
Heater Air Pocket or Heater OFF	• The heater / circulator temperature is more than 6 °C hotter than the bath temperature probe indicating an air pocket or stagnant hot water in the heater element. Follow the priming procedure on the back of the Wide Input Range Heater / Circulator.
Bath Temperature 2 ºC Over Setpoint	• Check for a faulty probe. • Contact Agilent Customer Care (“Obtaining Warranty and Other Services” on page 134).
Bath Overtemperature	• Turn off the bath heater. • Contact Agilent Customer Care (“Obtaining Warranty and Other Services” on page 134).
Bath Probe Open	• Ensure the bath probe is plugged in. • Replace the bath probe.
Bath Probe Short	• Replace the bath probe. • Contact Agilent Customer Care (“Obtaining Warranty and Other Services” on page 134).
Heater Probe Short	• Contact Agilent Customer Care (“Obtaining Warranty and Other Services” on page 134).

Table 17 Error Screens (Red)

<table>
<tr><td> 
</td><td>Spindle Speed Error

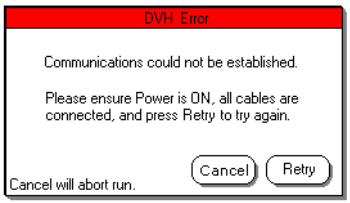
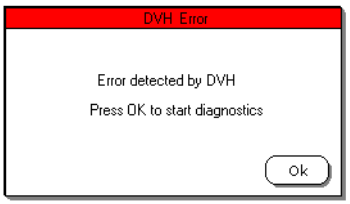
This Spindle Error screen displays when the spindle speed has exceeded the allowable tolerance range (“Menu Screen - Instrument Settings Screen 2” on page 84). Press Ok to resume the test and send a message to the printer, if installed.</td></tr>
<tr><td> 
</td><td>Fatal Spindle Error

• This Spindle Error screen displays when a serious error has been detected with the spindle motor. For the safety of the equipment and the operator, remove power before correcting the problem. Errors may include jammed paddles, obstructions in the path of the drive belt, and severe deterioration of the spindle motor.
• Contact Agilent Customer Care (“Obtaining Warranty and Other Services” on page 134).</td></tr>
<tr><td> 
</td><td>Autosampling Manifold Errors

The Stepper Motor Errors screen shows all of the possible errors associated with the manifold stepper motor. A red X displays before the current error condition. If a stepper motor error is encountered, the current run is stopped. You can press Ignore to disregard the error, but it must be corrected before a run may be restarted. Press Retry to re-test the stepper motor for errors.</td></tr>
</table>

Autosampling Manifold Error	Action
Over Current	• Contact Agilent Customer Care (“Obtaining Warranty and Other Services” on page 134).
Over Temperature	
Under Voltage	
Controller Command Retry Error	
Open Load	
Timeout	

Table 17 Error Screens (Red)

	**DVH Communications Error (709-DS)** DVH communication is tested at the beginning of each method or manual test start ("Main Screen - Run" on page 50). A DVH Communication Error displays when a communications error has been detected. Press **Cancel** to stop communication attempts with the DVH and abort the operation. Methods do not run until DVH communications have been established. Press **Retry** to attempt to establish communication again. If normal DVH communication is restored, the unit returns to normal operation.
	**DVH Error (709-DS)** This DVH Error screen displays at the beginning of each method or manual test start ("Main Screen - Run" on page 50) when an error in the operation of the DVH has been detected. Press **Ok** to load the DVH Diagnostics screen.

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5
Maintenance and Troubleshooting

Preventive Maintenance 116
Sample Line / Paddle / Basket Care 117
Vessels and Evaporation Covers 121
Water Bath and Temperature Probes (708-DS) 122
Manifold Maintenance 125
Accessing the Top Cover 126
Printer Maintenance 127

Preventive Maintenance

Preventive maintenance intervals may vary depending on the frequency of instrument usage.

Weekly Maintenance

Inspect the water bath and tubing for algae or other growth. If algae is present, change the water and add algaecide. Ensure the algaecide is compatible with PETG and vinyl plastics.

Monthly Maintenance

If necessary, drain the water from the water bath and clean it thoroughly. Refill the bath and add algaecide.

CAUTION Ammonia, bleach, alcohol, and other solvents can cause deterioration of the plastic. Use only cleansers approved for plastic materials. These can be found in the catalogs of most scientific supply houses. Additionally, do not use abrasive cleansers that may scratch the plastic.

Bi-Annual Maintenance

1. Remove the top cover.
2. Inspect the spindle drive belt for wear, fraying, and tension.

NOTE A small dusting of belt material may be found on the motor plate. This is normal and not a cause for concern.

3. Check that the spring-loaded belt tensioner is maintaining pressure on the belt and is not loose.

4 Following ESD guidelines, inspect all printed circuit board assemblies (PCBA) for corrosion and debris. If debris is found, use pressurized inert gas to expel it from the board. Also, ensure that the PCBAs are securely attached.

5 Following ESD guidelines, ensure all connectors are securely fastened to each PCBA and to the power supply, switch, sensors, or motors. Also inspect the connectors and cabling for damage.

6 Lubricate the linear bearing upright supports with 3-in-1 oil.

Sample Line / Paddle / Basket Care

Shafts

- When using with corrosive materials such as hydrochloric acid or media containing salts, be sure to rinse them thoroughly with deionized water immediately after each use, and dry thoroughly with a soft towel or cloth.
- Do not clean with abrasive cleansers or cloths. Use deionized water whenever possible. If you must use a cleanser or solvent, be sure that it is as mild as possible, non-abrasive, and fully compatible with fluorocarbons and stainless steel before use. If in doubt, call the service department for advice before proceeding.
- We recommend that you do not use a laboratory dishwasher. Clean paddles and basket shafts only by hand. The high temperatures to which your items would be subject in a dishwasher may damage the fluorocarbon coating.
- Be sure to handle with care. If you must clean or handle the shafts while they are still mounted on the instrument, use minimal pressure on the shaft to prevent them from bending. When secured in the drive unit of the instrument, just a little bit of pressure exerted on the shaft—especially near the blade or basket—can easily bend the shaft and cause significant wobble.
- Use care when removing vessels from the apparatus while the paddles or basket shafts are installed so that you do not bump them.
- When attaching or removing baskets, do not bend the clips excessively.

- Please store paddles and basket shafts properly between uses. Do not simply place these items in a drawer. They will be subject to nicks, chips, and scratches as they bump against each other. Place them back into the original styrofoam shipping container or other appropriate container between uses. This will prevent them from coming into contact with each other or anything else in the storage area.

NOTE Place protective caps on dry and clean threads when storing spin on/off shafts.

Baskets

- When using with corrosive materials such as hydrochloric acid or media containing salts, be sure to rinse them thoroughly with deionized water immediately after each use, and dry thoroughly with a soft towel or cloth.
- Please do not clean baskets with abrasive cleansers or cloths, especially if they're gold or PTFE coated (non-stick). Mesh openings on baskets could enlarge, which could have an effect on results. Use deionized water whenever possible. If you must use a cleanser or solvent, be sure that it is as mild as possible, non-abrasive, and fully compatible with fluorocarbons and stainless steel before use. If in doubt, contact the service department for advice before proceeding.
- We recommend that you do not use a laboratory dishwasher. Clean baskets only by hand. The high temperatures to which your baskets would be subject in a dishwasher may damage the fluorocarbon coating.
- Use caution when handling baskets. It is important that they retain their cylindrical shape, so take care not to kink or bend the mesh. Check frequently to ensure that the mesh is completely open and that there are no rips or tears.

- Please store baskets properly between uses. Do not simply place these baskets in a drawer. They will be subject to nicks, chips, and scratches as they bump against each other and they may get bent out of shape. Place them back into the original shipping container or other appropriate container between uses. This will prevent them from coming into contact with each other or anything else in the storage area.

Rinsing Sample Lines

If the Agilent 708-DS / 709-DS is configured with a sampling manifold, the sample lines require a routine rinsing after each test. A rinse tubing kit (17-1341) or rinse tray is provided to conveniently flush the sample tubing.

Rinse Tubing Kit

1 Attach one end of the lines of the rinse tubing kit to the sample cannulas and place the other in a container of an appropriate rinsing solution.

2 Activate the pumping mechanism to properly flush the tubing lines.

Rinse Tray

1 Raise the drive unit of the 708-DS / 709-DS to its maximum height.

2 Push each shaft up to provide clearance for the rinse tray.

NOTE Do not rotate the shafts with the shafts pushed up. This could cause damage to the cannulas / probes on the sampling manifold.

3 Fill the rinse tray with the desired cleaning solution.

4 Position the rinse tray on the vessel plate so that each sample cannula is above the tray.

5 Lower the sampling manifold.

6 Carefully lower the drive unit of the 708-DS / 709-DS until each sample cannula is submerged in the cleaning solution of the rinse tray.

7 Activate the pump configured with the system until the tubing is sufficiently cleansed.

8 Raise the manifold and drive unit.

9 Remove the rinse tray and properly dispose of the rinsing solution.

10 Lower the shafts to their appropriate location.

Rinse Cups (Optional)

If the Agilent 708-DS / 709-DS is configured with a sampling manifold, the sample lines require a routine rinsing after each test. Easy-to-attach rinse cups are available to make the flushing of the tubing simple and efficient.

1 Fill the rinse cups with the cleaning solution desired and attach a cup to each shaft.

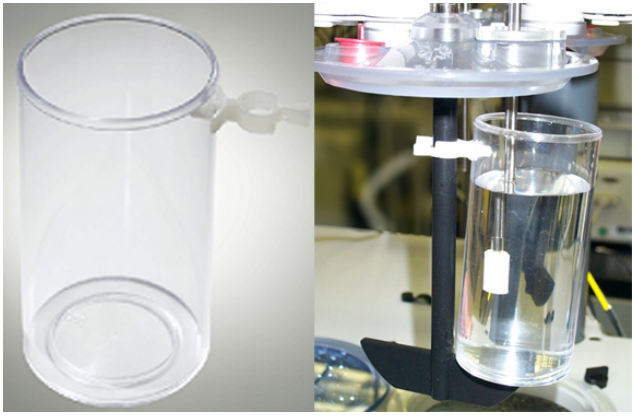

Figure 28 Rinse Cup

2 The sample cannulas must be sufficiently immersed in the solution. The return cannulas can either be contained in the cup or allowed to

drip into the vessel. The bottom of the cup rests on either the paddle blade or the basket clip attachment.

3 Activate the pump configured with the system until the tubing loop is sufficiently cleansed.

4 Finally, detach the rinse cups, place them in their transport tray, dispose of the waste, and rinse the cups to be ready for their next use.

Vessels and Evaporation Covers

1 Carefully wash the dissolution vessels after each use.

DVH Vessel Care (709-DS)

The DVH vessels have been designed for use exclusively with the Agilent 709-DS Dissolution Apparatus. The vessel was engineered to be easily substituted with another DVH vessel should it become accidentally broken or damaged during use. The vessel utilizes a Noryl collar and a PVC coating to properly align the vessel within the 709-DS as well as protect the electronic components. Although these materials have excellent thermal, electrical and chemical resistance; exposure to harsh organic liquids and temperatures above 55°C should be avoided. All electrical contact surfaces are gold plated to provide excellent corrosion resistance.

Your DVH vessel is highly water resistant, meaning it may be cleaned with routine manual glassware cleaning procedures and allowed to dry. Similar to water resistant watches or electrical devices this does not mean it is waterproof which means the vessel should not be deeply submerged, pressure washed or undergo extended submersion for greater than 30 minutes.

CAUTION Do not wash 709-DS vessels in a dishwasher. The connectors should be kept as dry as possible at all times. If the connectors become wet during hand washing, or have been submerged for longer than 30 minutes, it may be necessary to allow them to dry prior to use.

NOTE DVH vessels (709-DS) require extra care when rinsing. Ensure the vessel plate and attachment clips are dry and free from any debris before re-inserting the vessel.

Water Bath and Temperature Probes (708-DS)

Water Bath Care

The water bath supplied with the 708-DS is designed to be maintenance free except for occasional cleaning.

CAUTION Ammonia and bleach can cause deterioration of the plastic. Use only cleansers approved for plastic materials. These can be found in the catalogs of most scientific supply houses. Additionally, do not use abrasive cleansers that may scratch the plastic.

If algaecide or a clear bath product is used, ensure that it is compatible with PETG and vinyl. The flow path in the heater / circulator is primarily stainless steel and should tolerate most clear bath formulations. Check with the product manufacturer for compatibility.

Complete these steps if any of the water bath fittings are leaking:

1. Turn off the heater / circulator and drain the water bath completely.
2. If the inlet to the bath is leaking, remove the leaking right-top bath bulkhead fitting and unscrew the elbow fitting.
3. If the outlet to the bath is leaking, remove the tubing and unscrew the T-fitting from the left-bottom side of bath.
4. Inspect the bulkhead fitting gaskets for damage and replace them if necessary.
5. Remove old PTFE tape from all male fittings. Inspect threads for damage and replace the elbow of the T-fitting if necessary.
6. Apply new PTFE tape to the male fitting threads.
7. Reinstall and tighten the bulkhead fitting to the bath and / or screw in the elbow or T-fitting, depending on whether it's an inlet or outlet.
8. Fill the bath with water and inspect for leaks. If it's still leaking, contact Technical Service.

Water Bath Temperature Probe Accuracy Test

The temperature probe can be tested using a high-quality ohmmeter capable of at least four-digit resolution and a known temperature bath. Both the multi-meter and the bath temperature must be traceable to a known reference standard such as NIST.

1. Place the probe into a water bath with a known temperature and allow several minutes for the probe to equilibrate.
2. The resistance is measured by attaching the leads of the multi-meter to the top and shank of the ¼-inch phone plug.
3. Refer to the table on Page page 124 to find the resistance value of the probe at the bath temperature. Temperatures between the values listed may be interpolated.
4. Probes are interchangeable and manufactured with a tolerance of +/- 0.1 °C. Probes found to be outside of the tolerance of +/- 0.1 °C should be replaced.

Temp. Centigrade	Resistance Ohms	Temp. Centigrade	Resistance Ohms	Temp. Centigrade	Resistance Ohms
-5.0	9530	24.0	2354	53.0	724.50
-4.0	9046	25.0	2252	54.0	697.90
-3.0	8586	26.0	2156	55.0	672.50
-2.0	8151	27.0	2064	56.0	648.10
-1.0	7741	28.0	1977	57.0	624.80
0.0	7355	29.0	1894	58.0	602.40
1.0	6989	30.0	1815	59.0	580.90
2.0	6644	31.0	1739	60.0	560.30
3.0	6319	32.0	1667	61.0	540.50
4.0	6011	33.0	1599	62.0	521.50
5.0	5719	34.0	1533	63.0	503.30
6.0	5444	35.0	1471	64.0	485.80
7.0	5183	36.0	1412	65.0	469.00
8.0	4937	37.0	1355	66.0	452.90
9.0	4703	38.0	1301	67.0	437.40
10.0	4482	39.0	1249	68.0	422.50
11.0	4273	40.0	1200	69.0	408.20
12.0	4074	41.0	1152	70.0	394.50
13.0	3886	42.0	1107	71.0	381.20
14.0	3708	43.0	1064	72.0	368.50
15.0	3539	44.0	1023	73.0	356.20
16.0	3378	45.0	983.80	74.0	344.50
17.0	3226	46.0	946.20	75.0	333.10
18.0	3081	47.0	910.20	76.0	322.30
19.0	2944	48.0	875.80	77.0	311.80
20.0	2814	49.0	842.80	78.0	301.70
21.0	2690	50.0	811.30	79.0	292.00
22.0	2572	51.0	781.10	80.0	282.70
23.0	2460	52.0	752.20		

Figure 29 Resistance Value of Temperature Probe

Removing or Adjusting Cannulas / Probes

The manifold of the apparatus may contain up to two cannulas and one probe per vessel position depending on the options configured. To adjust or remove these items:

1 Loosen the thumbscrew on the individual position of the manifold and modify the location of the cannula / probe accordingly.

Manifold Maintenance

Removing the Manifold

The manifold of the Agilent 708-DS / 709-DS is installed and removed with the touch of a button. The initial installation procedure is described in "Sample Manifold Installation" on page 35.

For the purposes of cleaning, maintenance, or just to create additional space for manual testing, the manifold may be ejected from the drive unit. To remove the manifold, follow these steps:

1 Lift the drive unit to its fully raised position.

2 Disconnect the two thermistor RS232 cables (if AutoTemp is installed).

3 Remove the sample tubing from the black fasteners.

4 Remove the evaporation covers.

5 Balance the manifold with one hand and press **Eject** to fully lower the manifold until it is free from the drive unit. Catch the manifold as it is released.

The Manifold Control screen can be accessed by pressing **Menu** > **Diagnostics**.

Accessing the Top Cover

Removing Top Cover

1. Ensure the Lift Drive is in the full, down operational position. Turn off the power and remove the power cord.
2. Lower all paddle / basket shafts or remove them from the machine.
3. Remove the top screws from the front and back of the cover. Remove the left- and right-side screws from bottom sides of cover.
4. If a printer is installed in the top cover, lift the cover up approximately six inches and remove the two cable connectors from the printer inside.
5. Remove the cover away from the instrument.

Replacing the Top Cover

1. If a printer is installed in the top cover, reconnect the cable connectors to the printer inside the cover.
2. Press the cover down into place, aligning the front holes with the respective dosage delivery module (DDM) openings, and slipping over the left-hand power switch.
3. Re-fasten the cover screws.

Printer Maintenance

Removing a Thermal Paper Roll

Figure 30 Near-empty Paper Roll

NOTE

A red line on the side of the paper roll indicates the paper supply is almost exhausted. Replacement is recommended when the red line is visible. If the paper roll is not changed and the paper supply is exhausted, the 708-DS / 709-DS gets an out-of-paper signal from the printer, and displays an error on the screen.

1 Place fingers underneath the light-colored handle and pull forward to pop out the front of the printer.

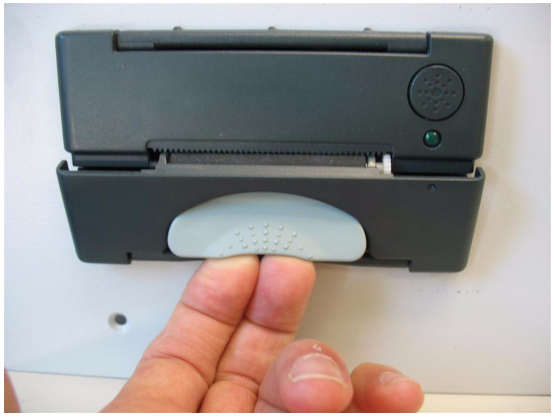

Figure 31 Accessing the Printer Handle

Opening the chamber reveals the paper roll or empty core inside.

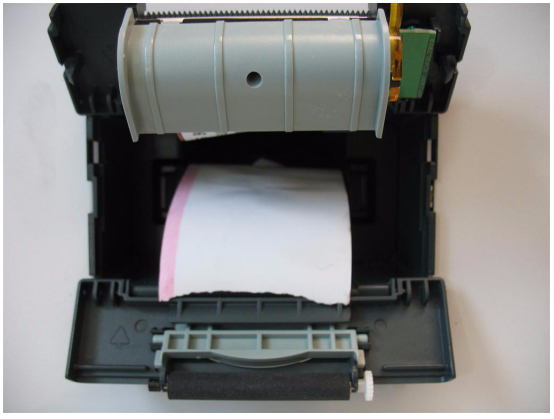

Figure 32 Open Printer Chamber

2 Internal side levers hold the roll in place. Since it is empty or nearly empty, use your fingers to pull out the small roll or core.

NOTE The empty core is disposable. Each new roll includes a cardboard core.

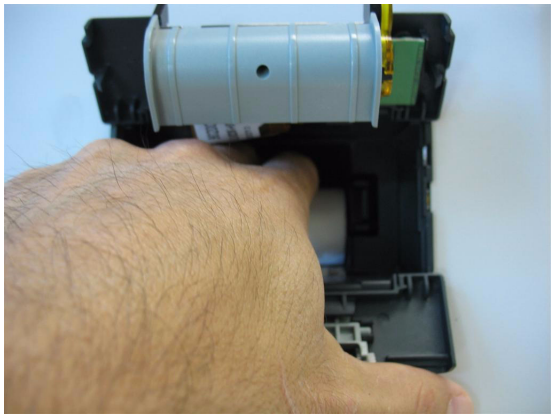

Figure 33 Removing the Thermal Paper Roll

Inserting a Thermal Paper Roll (5095-0307)

NOTE Only a 58 mm wide x 25 meter (maximum) thermal printer paper roll with a 13 mm core size can be used in the panel-mount printer. For an FDA environment, it must also meet the ten-year retention requirement.

1 With the paper chamber open, insert the paper roll until the levers snap the roll into place. Load the paper so the leading edge of the paper feeds from over the roll and not from under it.

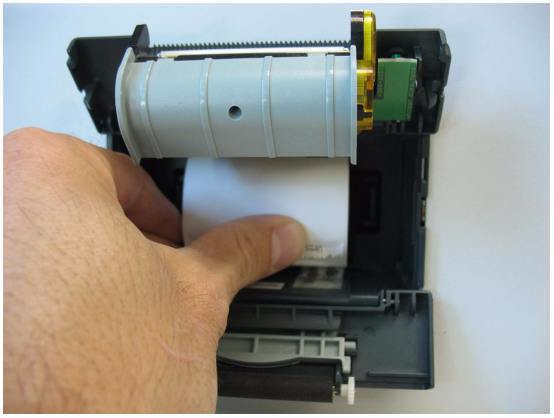

Figure 34 Inserting a Thermal New Paper Roll

2 Lead the paper out for a few inches and close the top lid of the chamber.

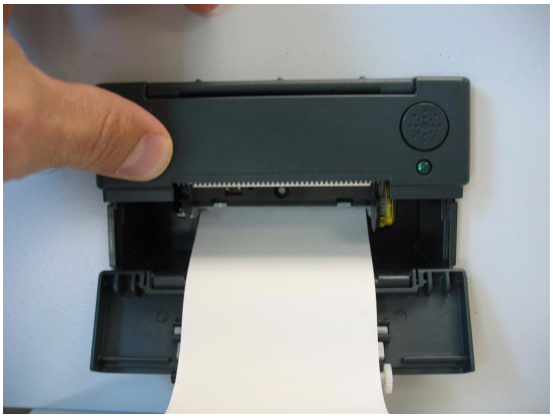

Figure 35 Leading Paper and Closing the Lid

3 Keeping the paper centered, close the bottom lid of the chamber and snap it into place.

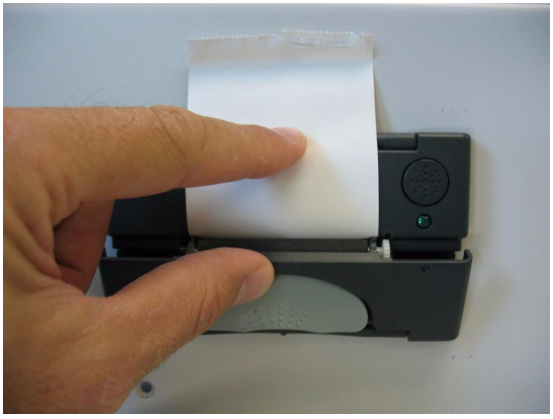

Figure 36 Closing the Printer Chamber

4 To verify that the paper is not skewed or jammed, press the upper-right hand button on the printer to feed some paper. If paper does not feed, re-open the chamber and re-center the paper.

Figure 37 Feeding Paper

Thermal Printer Test

In the second Diagnostics screen, press **Print Test Sheet** to print sample text and verify the printer is functioning properly.

Figure 38 Printer Test

Obtaining Warranty and Other Services

To place a service order (warranty or other services), please contact your local Customer Care Center. Contact information can be found at www.agilent.com under your country using the Contact Us link. Place your service request using the displayed phone number or E-mail address.

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